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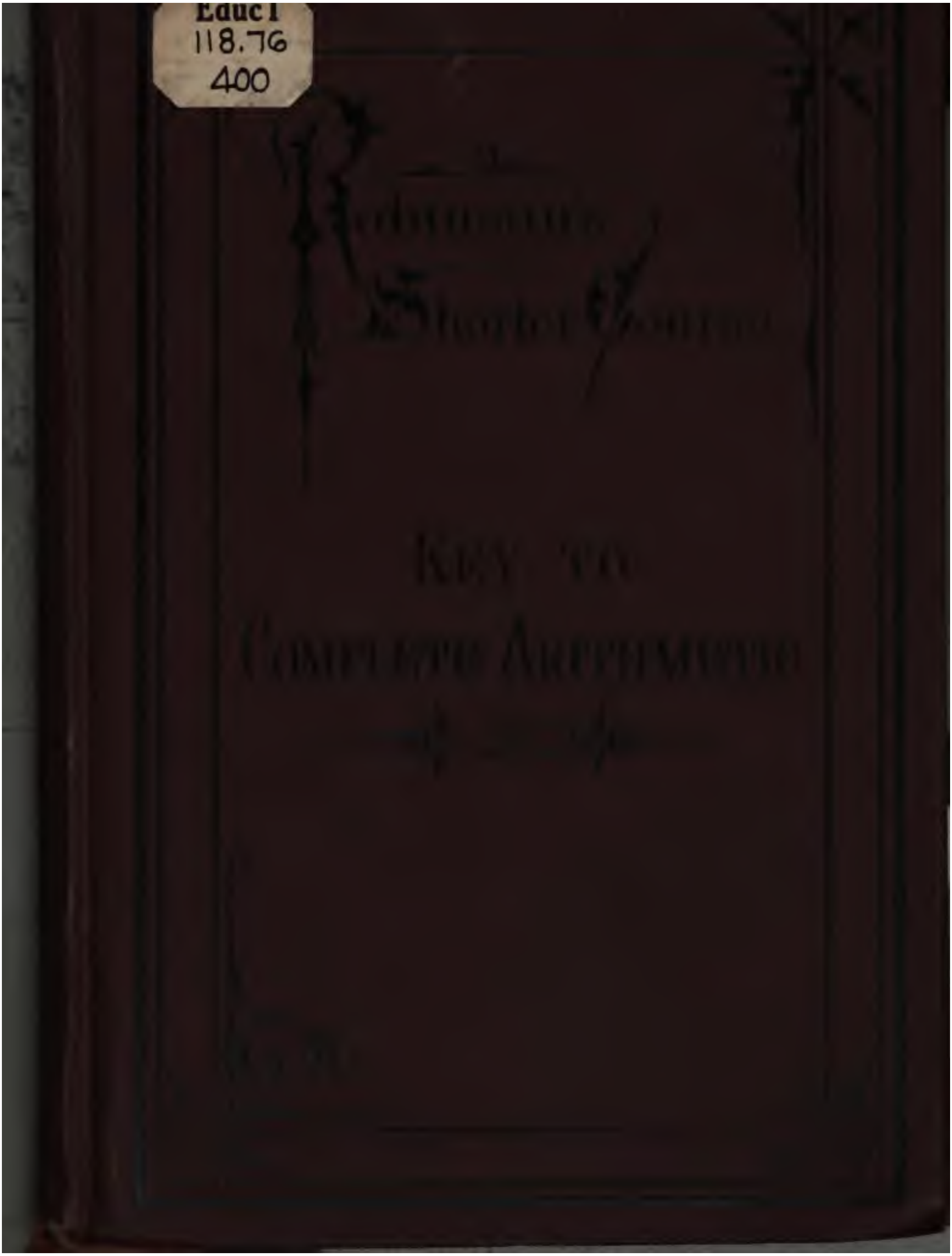

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PREFACE

A KEY to any mathematical work is not indispensably necessary to many teachers, but with the multiplicity of duties ordinarily devolving upon the teacher, time cannot always be had to answer or solve all questions that may be presented by the pupil. Hence a *key* becomes a great convenience, if not a necessity, in lessening the labor, and saving the time of the teacher, by presenting the shortest solution, and the best form of analysis, as a standard to which the pupil should be required to conform.

As *this key* has not been prepared for the *pupil*, but for the *teacher* and *private learner*, solutions of all the oral, and of many of the easier written examples are not included, and the operations are much abbreviated, the partial or intermediate results being often omitted, and the processes, for the most part, indicated by *signs*.

KEY

TO THE

COMPLETE ARITHMETIC.

Article 113.

1. ($1500−$960.90) × 3=$1617.30, *Ans.*

2. ($53.62−$46.45) × 7=$50.19, *Ans.*

3. ($9.12 × 388)−$2709=$829.56, *Ans.*

4. $5670−($7.25 × 365)=$3023.75, *Ans.*

5. 126720−108800=17920, *Ans.*

6. 23458−20580=2878, *Ans.*

7. 620 × 60=37200, *Ans.*

8. 542 × 279=151218, *Ans.*

9. $15760−$8561.25=$7198.75, *Ans.*

10. $3246+$10938+$4617=$18801, whole;
$10938+$4617=$15555, farm and stock.

11. ($184.50 × 48)−($4.80 × 130)=$8232, *Ans.*

12. $1150−($9 × 125)=$25, loss.

13. 82050−5000=77050, *Ans.*

14. (97000−6000)+1500=92500, *Ans.*

15. ($73.46−$3.96)+$1645=$1714.50, *Ans.*

16. $25592.32+($1759.50 × 10)=$43187.32, Ans.

Art. 145.

1. (2712÷113)×205=4920, *Ans.*

2. 2124÷236=9, *Ans.*

4. $\overline{36+114}\times\overline{5640-3007}=394950$, *Ans.*

5. 30128÷(4200÷75)=538, *Ans.*

6. $\overline{204\times378}\div\overline{378-204}=443\frac{30}{174}$, *Ans.*

7. \$30.76—(\$12.36+\$7.62)=\$10.78, *Ans.*

8. (746×23)—(18975÷25)=16399, *Ans.*

9. (\$3000—\$925.60)—\$2046.25=\$28.15, *Ans.*

10. (75 cts.×1600)÷40 cts=3000 lb.

11. (\$3376.25—\$638.75)÷365=\$7.50, *Ans.*

12. 170352÷4=42588, *Ans.*

13. (17605÷5)×204=718284, *Ans.*

14. (\$133×28)÷(\$1500—\$968)=7 yr., *Ans.*

15. 166656÷3=55552, *Ans.*

16. 12624×4=50496, *Ans.*

17. 43950÷6=7325, *Ans.*

18. 91864×9=826776, *Ans.*

20. (\$.60+\$.78+\$.90)÷3=\$.76, *Ans.*

21. (\$104+\$97+\$128+\$99÷4=\$107, *Ans.*

22. (\$1500+\$2976+\$1895)÷3=$\$2123\frac{2}{3}$, *Ans.*

23. $\$487.20\div(\$25-\overline{\$8.75+\$4.65})=42$ weeks, *Ans.*

24. (\$4578—\$1642)÷8=\$367, *Ans.*

25. $(\overline{\$75\times86}+\overline{\$54\times54})-\$7560=\$1806$, *Ans.*

26. \$6780+\$8200+\$8306+(\$8306—\$1345)=\$30247.

28. (5672—1974)÷2=1849, *less, Ans.*

29. ($1250—$190)÷2=$530, *carriage, Ans.*

30. (3789—227)÷2=1781 votes, U. C., *Ans.*

31. ($28475—$4625)÷2=$11925, *less* sum, *Ans.*

32. $(240\div\overline{5+10+15})\times 3=24$ boxes, *Ans.*

33. ($2492—$1424)÷3=356 Cd.;
$1424÷356=$4 cost, *Ans.*

34. $(\overline{269-3}\div 14)+37-48)\times 36=288$, *Ans.*

35. $(529\times 6)\div 1587=2$, *Ans.*

36. $(\overline{15125\div 3025}\times 48)\div 24=10$, *Ans.*

37. $4392\div 4+378=1476$, *Ans.*

38. $510\div 15+15=49$, *Ans.*

Art. 171.

10.

		10778
3281	3	9843
2805	3	935
476	1	476
459	1	459
Ans. 17	27	459

		14877
10353	1	10353
9048	2	4524
1305	3	3915
1218	2	609
Ans. 87	7	609

11.

		1116
620	1	620
496	1	496
124	4	496

		1488
Ans. 124	12	1488

		5184
396	13	5148
396	11	36

		6914
36	192	6912
36	18	2, Ans.

12. G. C. D. of 240 ft., 648 ft., and 420 ft. $=12$ ft., *Ans.*

13. G. C. D. of 231 bu., 393 bu., and 609 bu. $=3$ bu.

14. (15292 bu. $+$ 1520 bu. $+$ 504 bu.) $\div 4$, G. C. D., $=$ 4329 bags, *Ans.*

15. G. C. D. of \$630, \$1134, and \$1386 $=$ \$126;
\$630 $\div$ \$126 $=5$; \$1134 $\div$ \$126 $=9$; \$1386 $\div$ \$126 $=11$, *Ans.*

16. G. C. D. of 1729 ft. and 5850 ft. is 13.
$(\overline{7579 \times 2} \div 13) \times 7 = 8162$ rails, *Ans.*

Art. 178.

4. Divisors, $(2 \times 7 \times 37) \times$ quotients, $(9 \times 11) = 51282$.

5. Divisors, $(13 \times 2 \times 3 \times 2 \times 5) \times$ quotient, $2 = 1560$.

6. Divisors, $(2 \times 5 \times 3 \times 2 \times 2) \times$ quotients, $(4 \times 3 \times 5) = 7200$, *Ans.*

7. Divisors, $(3 \times 17) \times$ quotients, $(3 \times 20) = 3060$, *Ans.*

8. Divisors, $(2 \times 2) \times$ quotients, $(5 \times 3 \times 7 \times 4) = 1680$.

9. Prime Factors, $5 \times 7 \times 9 = 315$, *Ans.*

10. Divisors, $(2 \times 2 \times 3 \times 5 \times 2) \times$ quotient, $2 = 240$ oranges, *Ans.*

11. Divisors, $3 \times 2 \times 5) \times$ quotients, $(3 \times 2) = 180$, *Ans.*

12. Divisor, $2 \times$ quotients, $(5 \times 2 \times 3) =$ \$60, *Ans.*

13. L. C. M., $96 \times$ G. C. D., $4 = 384$, *Ans.*

14. L. C. M., $630 \div$ G. C. D., $10 = 63$, *Ans.*

15. Divisors, $(2 \times 2 \times 3 \times 3 \times 3) \times$ quotients, $(2 \times 7 \times 3) =$ \$4536, *Ans.*

16. Divisors, $(2 \times 2 \times 2 \times 2) \times$ quotients, $(5 \times 9) = 720$ *bushels, Ans.*

Art. 182.

5. $\dfrac{\overset{7}{\cancel{35}} \times \cancel{33} \times \overset{2}{\cancel{28}}}{\cancel{15} \times \cancel{14} \times \cancel{11}} = 14$, *Ans.*

6. $\dfrac{\overset{10}{\cancel{140}} \times \overset{13}{\cancel{39}} \times \cancel{13} \times \cancel{7}}{\cancel{7} \times \cancel{26} \times \cancel{21}} = 130$, *Ans.*

7. $\dfrac{11 \times \overset{3}{\cancel{21}} \times \cancel{26}}{\cancel{14} \times \cancel{13}} = 33$, *Ans.*

8. $\dfrac{\overset{61}{\cancel{183}} \times \cancel{78} \times \cancel{70} \times \cancel{12} \times \cancel{5}}{\cancel{14} \times \cancel{9} \times \cancel{3} \times \cancel{20} \times \cancel{5} \times \cancel{6}} = 61$, *Ans.*

9. $\dfrac{\overset{71}{\cancel{213}} \times \overset{19}{\cancel{190}} \times \cancel{14} \times \overset{11}{\cancel{264}}}{\cancel{56} \times \cancel{36} \times \cancel{30}} = 14839$, *Ans.*

10. $\dfrac{\overset{4}{\cancel{240}} \times \overset{2}{\cancel{56}} \times \overset{2}{\cancel{18}}}{\cancel{60} \times \cancel{28} \times \cancel{9}} = 16$, *Ans.*

11. $\dfrac{\overset{4}{\cancel{72}} \times \overset{4}{\cancel{48}} \times \overset{4}{\cancel{28}} \times \cancel{5}}{\underset{7}{\cancel{84}} \times \cancel{15} \times \cancel{7} \times \cancel{6}} = 9\tfrac{1}{7}$, *Ans.*

12. $\dfrac{\overset{33}{\cancel{66}} \times \cancel{18} \times \overset{3}{\cancel{27}} \times \cancel{25}}{\underset{14}{\cancel{84}} \times \cancel{45} \times 7 \times \cancel{30}} = 1\tfrac{1}{98}$, *Ans.*

13. $\dfrac{\overset{2}{\cancel{80}} \times \cancel{60} \times \cancel{50} \times 16 \times \cancel{14}}{\cancel{70} \times \cancel{50} \times \cancel{24} \times \cancel{20}} = 32$, *Ans.*

14. $\dfrac{\cancel{64} \times \cancel{7} \times 31 \times \cancel{15} \times \cancel{88} \times 13}{\cancel{8} \times \cancel{56} \times \cancel{55} \times \cancel{4} \times \cancel{6}} = 403$, Ans.

15. $\dfrac{\cancel{12} \times \overset{10}{\cancel{60}} \times \cancel{27} \times \cancel{35}}{\cancel{7} \times \cancel{15} \times \underset{7}{\cancel{42}} \times \cancel{108}} = 1\frac{3}{7}$, *Ans.*

16. $\dfrac{\cancel{77} \times \overset{4}{\cancel{100}} \times 18 \times \overset{4}{\cancel{64}}}{\cancel{25} \times \cancel{11} \times \underset{7}{\cancel{49}} \times \cancel{16}} = 41\frac{1}{7}$, *Ans.*

17. $\dfrac{\$.\overset{2}{\cancel{4}} \times \overset{5}{\cancel{45}}}{\$\cancel{18}} = 10$ tons, *Ans.*

18. $\dfrac{\$.\overset{7}{\cancel{70}} \times \overset{14}{\cancel{112}}}{\$.\cancel{80}} = 98$ bbl., *Ans*

19. $\dfrac{\$.\cancel{10} \times \overset{65}{\cancel{195}} \times \cancel{7}}{\$.\underset{3}{\cancel{30}} \times \underset{8}{\cancel{56}}} = 8\frac{1}{2}$ tubs, *Ans.*

20. $\dfrac{4s. \times \overset{4}{\cancel{48}}}{\cancel{12}} = 16$ shillings, *Ans.*

21. $\dfrac{\$.10 \times \overset{5}{\cancel{55}} \times \cancel{24}}{\cancel{88}\text{ bbl.} \times \cancel{3}} = \$.50$, *Ans.*

22. $\dfrac{\$.\overset{9}{\cancel{27}} \times \overset{4}{\cancel{20}}}{\cancel{15}\text{ lb.}} = \$.36$, *Ans.*

23. $\dfrac{\$.\cancel{75} \times \overset{120}{\cancel{240}}}{\$.\cancel{1}.\cancel{50}}$ 120 bushels, *Ans.*

24. $\dfrac{\$.\cancel{40} \times \overset{22}{\cancel{132}}}{(\$.\cancel{75} \times \cancel{2}) + \$.\cancel{40}} = 22$ yd. of 2d; 22 × 2=44 yd. *of 1st, Ans.*

25. $\dfrac{\$.\overset{7}{\cancel{56}} \times \cancel{2} \times \overset{11}{\cancel{22}} \times \cancel{6}}{\cancel{24}\text{ lb.} \times \cancel{8}} = \$.77$, *Ans.*

26. $\dfrac{\$\overset{144}{\cancel{1.20}} \times \cancel{12}}{\$.\cancel{60}} = 144$ bushels, *Ans.*

27. $\dfrac{\cancel{3}\text{s.} \times \overset{4}{\cancel{28}} \times \cancel{21}}{\cancel{7}\text{s.} \times \cancel{63}} = 4$ chests, *Ans.*

28. $\dfrac{\$.\overset{16}{\cancel{80}} \times \overset{3}{\cancel{75}}}{\$\cancel{1.25}} = 48$ days' work, *Ans.*

Art. 226.

1. $124\frac{1}{4}-36\frac{2}{13}=88\frac{5}{52}$, *Ans.*

2. $216\frac{8}{9}-147\frac{4}{7}=69\frac{20}{63}$, *Ans.*

3. $700\frac{5}{8}-517\frac{25}{28}=182\frac{41}{56}$, *Ans.*

4. $1042\frac{12}{21}-(166\frac{5}{9}-214\frac{3}{7})=1014\frac{44}{63}$, *Ans.*

5. $\frac{133}{144}-(\frac{1}{8}+\frac{5}{12}+\frac{5}{18})=\frac{5}{48}$, *Ans.*

6. $\frac{17}{21}-\frac{4}{9}=\frac{23}{63}$, *Ans.*

7. $1446\frac{1}{16}-1297\frac{1}{24}=149\frac{1}{48}$, *Ans.*

8. $\$30-(\$15\frac{3}{8}+\$9\frac{5}{12}+\$3\frac{7}{16})=\$1\frac{37}{48}$ gain, *Ans.*

9. $\frac{46}{21}-\frac{61}{56}=1\frac{17}{168}$, *Ans.*

10. $11\frac{1}{2}-5\frac{4}{11}=6\frac{3}{22}$, *Ans.*

11. $48-13\frac{1}{14}=34\frac{13}{14}$, *Ans.*

12. $73\frac{1}{10}-4\frac{11}{15}=68\frac{11}{30}$, *Ans.*

13. $68\frac{7}{9}+89\frac{19}{27}=158\frac{13}{27}$, *Ans.*

14. $342-13\frac{2}{65}=328\frac{63}{65}$, *Ans.*

15. $182\frac{4}{5}-17\frac{1}{2}=265\frac{3}{10}$, *Ans.*

16. $\$707\frac{55}{100}+\$91\frac{9}{10}=\$699\frac{9}{20}$, *Ans.*

Art. 232.

17. $\$4\frac{5}{8}\times 15=\$69\frac{3}{8}$, *Ans.*

18. $\$\frac{7}{8}\times\frac{99}{4}=\$21\frac{21}{32}$, *Ans.*

19. $\$\frac{69}{\cancel{16}}\times\overset{5}{\cancel{80}}=\$345$, *Ans.*

20. $\$\frac{9}{\underset{4}{\cancel{16}}}\times\frac{\overset{27}{\cancel{108}}}{5}=\$12\frac{3}{20}$, *Ans.*

21. $\$15\frac{3}{10}\times 4\frac{1}{8}=\$63\frac{9}{80}$, *Ans.*

22. $\$\frac{\overset{13}{\cancel{39}}}{5}\times\frac{56}{\cancel{3}}=\$145\frac{3}{5}$, *Ans.*

23. $\$\frac{\overset{5}{\cancel{15}}}{4}\times\frac{37}{\underset{2}{\cancel{6}}}=\$23\frac{1}{8}$, *Ans.*

24. $\$\frac{37}{\underset{2}{\cancel{4}}}\times\overset{63}{\cancel{126}}=\$11.65\frac{1}{2}$, *Ans.*

25. $\$\frac{\overset{25}{\cancel{125}}}{2}=\frac{367}{\underset{2}{\cancel{10}}}=\$2293\frac{3}{4}$, *Ans.*

26. $\$\frac{1028}{\cancel{5}}\times\overset{7}{\cancel{35}}=\$7196$, *Ans.*

27. $\$\frac{\overset{61}{\cancel{549}}}{\cancel{10}}\times\frac{\cancel{5}}{\cancel{6}}\times\frac{\overset{47}{\cancel{470}}}{\cancel{5}}\times\frac{\overset{2}{\cancel{4}}}{\cancel{3}}=\$5734$, *Ans.*

28. $\$1\frac{2}{3}\times\frac{229}{\underset{4}{\cancel{8}}}=\$47\frac{17}{24}$, *Ans.*

29. $\$\frac{13}{\underset{4}{\cancel{16}}}\times\frac{\cancel{4}}{8}=\$\frac{13}{32}$, *Ans.*

30. $\$\overset{25}{\cancel{125}}\times\frac{9}{\underset{8}{\cancel{40}}}=\$28\frac{1}{8}$, *Ans.*

31. $\$\frac{\overset{67}{\cancel{134}}}{5}\times\frac{149}{\underset{10}{\cancel{20}}}=\$199\frac{33}{50}$, *Ans.*

32. $\$365\frac{7}{8}\times\frac{1}{5}=\$73\frac{7}{40}$ loss, *Ans.*

33. $\$\frac{7}{8}\times\frac{507}{4}=\$110\frac{29}{32}$, *Ans.*

34. $\frac{\overset{59}{\cancel{472}}}{9}\times\frac{805}{\underset{18}{\cancel{144}}}+\frac{2365}{18}=424\frac{46}{81}$, *Ans.*

Art. 235.

9. $7\overline{)42\frac{7}{8}}$

$6\frac{1}{8}$, *Ans.*

10. $8\overline{)128\frac{11}{20}}$

$16\frac{11}{160}$, *Ans.*

11. $\frac{3067}{36\times21}=4\frac{43}{756}$, *Ans.*

12. $\frac{745}{3\times48}=5\frac{25}{144}$, *Ans.*

13. $\frac{3677}{12\times25}=12\frac{77}{300}$, *Ans.*

14. $3|\cancel{0}\overline{)51|\cancel{0}\frac{5}{6}}$

$17\frac{1}{36}$, *Ans.*

15. $\$\frac{\cancel{5}}{3\times\underset{4}{\cancel{20}}}=\$\frac{1}{12}$, *Ans.*

16. $\frac{437}{6\times14}=5\frac{17}{84}$, the other, *Ans.*

17. $\frac{\overset{7}{\cancel{35}}}{36\times\underset{5}{\cancel{25}}}=\frac{7}{180}$, *Ans.*

18. $\$\frac{499}{4\times12}=\$10\frac{19}{48}$, *Ans.*

19. $\frac{\overset{217}{\cancel{3472}}}{5\times\underset{3}{\cancel{48}}}=14\frac{7}{15}$, *Ans.*

20. $\$\frac{\overset{3852}{\cancel{23112}}}{5\times\underset{9}{\cancel{54}}}=\$85\frac{3}{5}$, *Ans.*

21. $\frac{9991}{8\times32}=39\frac{7}{256}$, the other, *Ans.*

22. $\frac{\overset{219}{\cancel{2409}}}{32\times\cancel{11}}=6\frac{27}{32}$ lb., *Ans.*

23. $\frac{2113}{\cancel{4}}\times\frac{1}{12}\times\frac{\cancel{4}}{1}=176\frac{1}{12}$ lb., *Ans.*

Art. 238.

32. $\frac{\overset{4869}{\cancel{14607}}}{16}\times\frac{5}{\cancel{3}}=1521\frac{9}{16}$, *Ans.*

33. $\frac{\overset{21}{\cancel{105}}}{\cancel{2}}\times\frac{\overset{3}{\cancel{6}}}{\cancel{5}}=63$, *Ans.*

34. $\frac{\overset{85}{\cancel{425}}}{\cancel{2}}\times\frac{\overset{3}{\cancel{6}}}{\underset{29}{\cancel{145}}}=8\frac{23}{29}$, *Ans.*

35. $\$\overset{2090}{\cancel{6270}}\times\frac{5}{\cancel{3}}=\$10450$, *Ans.*

36. $\frac{\overset{7}{\cancel{98}}}{\cancel{3}\times\cancel{14}}\times\frac{\overset{7}{\cancel{21}}}{4}=12\frac{1}{4}$ tons, *Ans.*

37. $\$\frac{\overset{43}{\cancel{86}}}{\cancel{5}}\times\frac{\cancel{5}}{37}\times\frac{1}{\underset{4}{\cancel{8}}}=\$\frac{43}{148}$, *Ans.*

38. $\$.\overset{.03}{\cancel{33}}\times\frac{3}{\cancel{11}}\times\frac{97}{4}=\$2.18\frac{1}{4}$, *Ans.*

40. $\frac{7}{\underset{2}{\cancel{8}}}\times\frac{\cancel{4}}{3}=1\frac{1}{6}$, *Ans.*

41. $\frac{\overset{21}{\cancel{63}}}{5}=\frac{7}{\underset{25}{\cancel{75}}}=1\frac{28}{125}$, *Ans.*

42. $\frac{\overset{529}{\cancel{1058}}}{9\times\underset{9}{\cancel{18}}}=6\frac{43}{81}$, *Ans.*

43. $\frac{\cancel{3}}{\underset{2}{\cancel{4}}}\times\frac{7}{\cancel{3}}\times\frac{\overset{5}{\cancel{10}}}{9}=1\frac{17}{18}$, *Ans.*

44. $\frac{\cancel{2}}{\cancel{3}}\times\frac{\cancel{11}}{\cancel{12}}\times\frac{\cancel{18}}{1}\times\frac{2}{\cancel{11}}=2$, *Ans.*

45. $\frac{3}{\underset{5}{\cancel{20}}}\times\frac{\overset{6}{\cancel{24}}}{17}=\frac{18}{85}$, *Ans.*

46. $\$\frac{\overset{5}{\cancel{15}}}{\cancel{3}}\times\frac{5}{\underset{2}{\cancel{12}}}=6\frac{1}{4}$ mo., *Ans.*

47. $\frac{489}{\underset{10}{\cancel{20}}}\times\frac{\cancel{2}}{35}=1\frac{139}{350}$, *Ans.*

48. $\frac{173}{\underset{2}{\cancel{56}}}\times\frac{\cancel{28}}{31}=2\frac{49}{62}$, *Ans.*

49. $\frac{5}{\cancel{9}}\times\frac{\cancel{3}}{7}\times\frac{\cancel{15}}{\underset{5}{14}}=\frac{25}{98}$, *Ans.*

50. $\frac{131}{\underset{2}{\cancel{8}}}-\frac{\cancel{4}\times17}{73}=15\frac{37}{146}$, *Ans.*

51. $\frac{\overset{44}{\cancel{88}}\times\cancel{8}}{9}\times\frac{1}{15}\times\frac{17}{\cancel{16}}=5\frac{73}{135}$, *Ans.*

52. $\frac{249}{\underset{22}{\cancel{110}}}\times\frac{\overset{3}{\cancel{15}}}{161}=\frac{747}{3542}$, *Ans.*

Art. 245.

1. $72\div18=4$, $\frac{5}{18}\times\frac{4}{4}=\frac{20}{72}$; $72\div3=24$, $\frac{2}{3}\times\frac{24}{24}=\frac{48}{72}$;
$72\div8=9$, $\frac{7}{8}\times\frac{9}{9}=\frac{63}{72}$; $72\div9=8$, $\frac{7}{9}\times\frac{8}{8}=\frac{56}{72}$, *Ans.*

2. Divisors, $(2\times3)\times$ quotients, $(7\times2)=84$, L. C. M.

3. $1206\frac{5}{8}+470\frac{4}{5}=1677\frac{17}{40}$, the greater, *Ans.*

4. $\frac{77}{10}-\frac{62}{15}=3\frac{17}{30}$, *Ans.*

5. $\frac{\overset{4869}{\cancel{14607}}}{8}\times\frac{5}{\cancel{3}}=3043\frac{1}{8}$, *Ans.*

6. $1-\frac{62}{63}=\frac{1}{63}$; $144\times\frac{63}{1}=9072$, *Ans.*

7. $\$\frac{\overset{1153}{\cancel{3459}}}{\cancel{2}}\times\frac{\overset{4}{\cancel{8}}}{\cancel{3}}=\$4612$, *Ans.*

8. $1-\frac{103}{120}=\frac{17}{120}$; $\$1500\times\frac{120}{17}=\$10588\frac{4}{17}$, *Ans.*

9. $\frac{7}{\underset{3}{\cancel{9}}}\times\frac{\overset{13}{\cancel{39}}}{4}=7\frac{7}{12}$, divisor, *Ans.*

10. $\$\frac{\overset{5473}{\cancel{27365}}}{\cancel{6}}\times\frac{\overset{2}{\cancel{12}}}{\cancel{5}}=\$10946$, *Ans.*

11. $\$\frac{\overset{4}{\cancel{160}}}{\cancel{3}}\times\frac{1}{\cancel{4}}\times\frac{\cancel{3}}{\cancel{10}}=\$4$, *Ans.*

12. $\$.\frac{\overset{3}{\cancel{36}}\times\overset{5}{\cancel{20}}}{\cancel{3}}\times\frac{5}{\cancel{16}}=\$.75$, *Ans.*

13. $\left(\frac{543}{2}-\frac{3077}{16}\right)\times\frac{289}{5}=\$4577\frac{3}{8}$, *Ans.*

14. $\$\frac{\overset{6163}{\cancel{12326}}}{5}\times\frac{1}{\underset{3}{\cancel{6}}}=\$410\frac{13}{15}$, *Ans.*

15. $\$\frac{\overset{39}{\cancel{78}}}{\underset{8}{\cancel{128}}}\times\frac{\cancel{16}}{\cancel{2}}=4\frac{7}{8}$ tons, *Ans.*

16. 240 mi. $\times\frac{\overset{2}{\cancel{4}}}{23}\times\frac{7}{\cancel{2}}=146\frac{2}{23}$ mi., *Ans.*

17. A does $\frac{1}{8}$ in 1 day; B and C, $\frac{1}{6}$; hence,
A, B, and C do $\frac{1}{8}+\frac{1}{6}=\frac{7}{24}$, in 1 day;
and, $1\div\frac{7}{24}=3\frac{3}{7}$ days, *Ans.*

18. A, B, and C do $\frac{1}{5}$ in 1 day; B and C, $\frac{1}{8}$; hence,
A does $\frac{1}{5}-\frac{1}{8}=\frac{3}{40}$, in 1 day;
and, $1\div\frac{3}{40}=13\frac{1}{3}$ days, *Ans.*

19. $\$\frac{617}{\cancel{3}}\times\frac{5}{\cancel{3}\times4}\times\frac{\cancel{3}\times\cancel{3}}{4}=\$192\frac{13}{16}$, *Ans.*

20. $\$\frac{\overset{71}{\cancel{355}}}{2}\times\frac{1}{\cancel{5}}\times\frac{3}{1}\times\frac{3}{76}=\$4\frac{31}{152}$, *Ans.*

21. $\$\overset{1125}{\cancel{9000}}\times\frac{\cancel{3}}{\cancel{2}}\times\frac{5}{\cancel{12}}=\$5625$, *Ans.*

22. $\frac{11+8}{12+8}=\frac{19}{20}$; $\frac{19}{20}-\frac{11}{12}=\frac{1}{30}$, increased, *Ans.*

23. $\frac{10+8}{7+8}=\frac{18}{15}$; $\frac{10}{7}-\frac{18}{15}=\frac{8}{35}$, diminished, *Ans.*

24. $\$\frac{19}{2}\times\frac{5}{8}\times\frac{5}{3}=9\frac{43}{48}$ bushels, *Ans.*

25. $\$12500\times\frac{12}{5}=\$30000$, estate;
$\$12500\times\frac{5}{7}=\$8928\frac{4}{7}$, daughter's share;
$\$\frac{\overset{25}{\cancel{62500}}}{7}\times\frac{1}{\underset{12}{\cancel{30000}}}=\frac{25}{84}$, *Ans.*

26. $\$\frac{\cancel{3675}}{2}\div3675=\$\frac{1}{2}$, *Ans.*

27. $\$\frac{\overset{189}{\cancel{4725}}}{\cancel{2}}\times\frac{1}{\cancel{25}}\times\frac{\overset{2}{\cancel{4}}}{1}=378$ bbl., *Ans.*

28. $\frac{\overset{47}{\cancel{470}}}{\cancel{3}}$ A. $\times\frac{\cancel{4}}{\cancel{5}}\times\frac{1}{\cancel{2}}\times\frac{\cancel{3}}{\cancel{4}}=47$ acres;
$\$\frac{85}{2}\times\left(\overline{\frac{\overset{94}{\cancel{470}}}{3}\text{ A.}\times\frac{4}{\cancel{5}}-47}\right)=\$3329\frac{1}{6}$, *Ans.*

29. $\$\overset{36}{\cancel{360}}\times\frac{3}{\cancel{10}}=\$108$, *Ans.*

30. $\$\frac{63}{2}\times\frac{\cancel{2}}{15}\times\frac{7}{\cancel{2}}=14\frac{7}{10}$ cords, *Ans.*

31. $\left(\overline{\$\frac{\overset{13}{\cancel{65}}}{2}\times\frac{8}{\cancel{5}}\div\$4}\right)+7=20$ bbl., *Ans.*

32. $\$\frac{\cancel{15}}{\cancel{2}}\times\frac{\overset{2}{\cancel{4}}}{\cancel{3}\times\cancel{5}}\times\frac{7}{8}=\$1\frac{3}{4}$, *Ans.*

33. (\$3500—\$740) $\times\frac{2}{3}$=\$1840, *Ans.*

34. $\frac{4}{5}-\frac{1}{2}=\frac{3}{10}$; $\frac{\overset{61}{\cancel{183}}}{\underset{2}{\cancel{4}}}$ ft. $\times\frac{\overset{5}{\cancel{10}}}{\cancel{3}}=152\frac{1}{2}$ feet, *Ans.*

35. $\frac{21}{5}-\frac{4}{5}=\frac{17}{5}$; $\frac{17}{5}\div2=1\frac{7}{10}$, less; $1\frac{7}{10}+\frac{4}{5}=2\frac{1}{2}$, greater.

36. $\frac{1}{3}+\frac{1}{4}+\frac{2}{13}=\frac{115}{156}$; $\frac{156}{156}-\frac{115}{156}=\frac{41}{156}$;
$\$\overset{62}{\cancel{2542}}\times\frac{156}{\cancel{41}}=\$9672$, total amount;
\$9672÷3=\$3224, cotton; \$9672÷4=\$2418, sugar;
$\$\overset{744}{\cancel{9672}}\times\frac{2}{\cancel{13}}=\$1488$, molasses, *Ans.*

37. $\frac{\overset{3}{\cancel{12}}}{25}\times\frac{7\times1}{2}\times\frac{7}{\underset{2}{\cancel{8}}}\times\frac{9}{2}=\frac{1323}{200}$;
$\frac{1323}{200}+\frac{25}{6}=\frac{6469}{600}$; $\frac{6469}{\underset{200}{\cancel{600}}}\times\frac{\cancel{3}}{7}=\frac{6469}{1400}$;
$\frac{6469}{600}-\frac{6469}{1400}=6\frac{169}{1050}$, *Ans.*

38. $\frac{\overset{5}{\cancel{15}}}{\underset{7}{\cancel{63}}}\times\frac{\overset{5}{\cancel{15}}}{14}=\frac{25}{98}$, *Ans.*

39. $\frac{65}{\underset{3}{\cancel{12}}}=\frac{\overset{7}{\cancel{14}}\times\cancel{2}}{27}=5\frac{50}{81}$, *Ans.*

40. $\frac{7}{3}-\frac{28}{25}=1\frac{16}{75}$, *Ans.*

41. $\frac{2}{3}+\frac{57}{220}=\frac{611}{660}$, *Ans.*

42. $\frac{7}{\cancel{5}}\times\frac{\cancel{5}}{3}=2\frac{1}{3}$, *Ans.*

43. $\frac{107}{5}+2-\frac{4}{3}=22\frac{1}{15}$, *Ans.*

44. $\frac{306}{407}-\frac{1}{4}=\frac{817}{1628}$, *Ans.*

45. 2÷4=$\frac{1}{2}$, *Ans.*

Art. 290.

4. \$43.1875—\$16.5=\$26.6875, *Ans.*

5. 1.1066—.630482=.376118, *Ans.*

6. \$304.96—\$143.875=\$161.085, *Ans.*

7. 2—.00345=1.99655, *Ans.*

8. 10.0402—.000026=10.040174, *Ans.*

9. 115—11.5=103.5, *Ans.*

10. 5—.0000125=4.9999875, *Ans.*

11. $.875—$.625=$.25, *Ans.*

12. $.75—$.6875=$.0625, *Ans.*

13. 7.005—.7005=6.3045, *Ans.*

14. 1.169375—.9308571=.2385179, *Ans.*

15. 1.875—.001875=1.873125, *Ans.*

16. $200—$70.9375=$129.0625, *Ans.*

17. .4—.0433=.3567, *Ans.*

18. .96875—.392=.57675, *Ans.*

19. .105—.015=.09, *Ans.*

20. 7346 A.—5151.15 A.=2194.85 acres, *Ans.*

21. $70—$63.541=$6.46, *Ans.*

22. $311.5+$100.08=$411.58, *Ans.*

23. .95+.7125=1.6625, *Ans.*

24. 5.45—1.375=4.075, *Ans.*

25. $250—$155.95+$.95=$95, *Ans.*

26. $49.12—$2.05=$47.07, *Ans.*

Art. 293.

14. 3.126 × .046 × .3=.0431388, *Ans.*

15. 9.375 × .075 × 10=7.03125, *Ans.*

16. 18.75 × 1.001 × .8=15.015, *Ans.*

17. .1875 × .045 = .0084375, *Ans.*

18. 327.5 × .9 × 4.25 = 1252.6875, *Ans.*

19. $8.56 × .0625 × 100 = $53.5, *Ans.*

20. 18.36 × .00625 × 1000 = 114.75, *Ans.*

21. .0075 × 100 × .082 = .0615, *Ans.*

22. $19.50 + $87.4725 + $48.875 = $155.8475, *Ans.*

23. 127.25 bu. × 4.375 = 556.71875 bu., *Ans.*

24. $2.625 × 170 = $446.25, *Ans.*

25. $4.38 × 100 = $438, *Ans.*

26. $72.75 × 204.7 = $14891.925, *Ans.*

27. $.0925 × 580.5 = $53.69625, *Ans.*

28. $97.625 × 126 = $12300.75, *Ans.*

29. $.85 × 36.75 × 3.625 = $113.2359375, *Ans.*

30. $198.55 — $97.375 = $101.175, *Ans.*

31. $450.75 — $79.38 + $18.12 = $389.49, *Ans.*

32. $74.75 × 3.25 = $242.9375, *Ans.*

33. .913976 + 401.875 = 402.788976, *Ans.*

34. 4.93 × .9 = 4.437, *Ans.*

35. 4.31564 — 2.625 = 1.69064, *Ans.*

36. (.0408375 + .02948) × 100 = 7.03175, *Ans.*

Art. 296.

27. $1730.75 ÷ ($4816 ÷ 64) = 23 tons, *Ans.*

28. 32.4 yd. ÷ 2.7 yd. = 12 coats, *Ans.*

29. $4885.80 ÷ $287.4 = 17 horses, *Ans.*

30. $\$224.40 \times (\overline{\$82.5 \div 125} \times 2.5) = 136$ bbl., *Ans.*

31. $(\$11.375 \times 3.5) \times 20.125 = \$65.40625$, *Ans.*

32. $\$46.75 \div (\$6.375 \div .75) = 5.5$ cwt, *Ans.*

33. $(\$4.5 \times 10.75) \div 7.74 = \$6.25$, *Ans.*

34. $(\$125 - \overline{\$3.25 \times 12.5}) \div \$.625 = 135$ lb., *Ans.*

35. $(.056 + .01575 \times 100) - .8 = 6.375$, *Ans.*

36. $713.286 \div (.306 \times 1.5) = 1554$, *Ans.*

37. $(.0006 \times 10000 + 80) \div .125 = 688$, *Ans.*

38. $6.562 + 1.134 \div 3.702 = 2.07887$, *Ans.*

39. $\$469.5 \times .0002415 \times 100 = \$11.338+$, *Ans.*

40. $\$4396.40 \div \$10.47 - \$125 = \$295$, *Ans.*

Art. 313.

2. $750 \div 3 = \$250$, *Ans.* $750 \div 4 = \$187.50$, *Ans.*

3. $631 \div 2 = \$315.50$. $\$1250 \div 2 = \$625$. $\$1605 \div 2 = \$802.50$, *Ans.*

4. $\overline{43 \times 12} \div 3 = \$172$, *Ans.*

5. $(\overline{140 \div 6} + \overline{204 \div 12}) - (41 \div 2) = \$19.83+$, *Ans.*

7. $642 + (642 \div 3) = \$856$, *Ans.*

8. $320 + (320 \div 5) = \$384$, *Ans.*

Art. 314.

2. $\$318 \times 3 = 954$. $\$318 \times 2 = 636$, *Ans.*

3. $\$240 \times 6 = 1440$. $\$240 \times 5 = 1200$. $\$240 \times 4 = 960$.

4. $\$350 \times 16 = 5600$. $\$350 \times 12 = 4200$, *Ans.*
$\$350 \times 10 = 3500$. $\$350 \times 8 = 2800$, *Ans.*

5. $\$150.75 \times 4 = 603$, *Ans.*

Art. 315.

2. ($9.375 × 1684) ÷ 100 = $157.875, *Ans.*

3. ($174.55 × 2284) ÷ 1000 = $3986.772, *Ans.*

4. ($.98 × 4575) ÷ 100 = $44.835, *Ans.*

5. ($8.75 × 53672) ÷ 1000 = $4696.30, *Ans.*

6. ($3.125 × 2108) ÷ 100 = $65.875, *Ans.*

7. ($16.25 × 2700) ÷ 100 = $438.75, *Ans.*

8. $\overline{\$10.50 \times 875} \div 1000 = \$9.1875$, *Ans.*

9. $\overline{\$1.86 \times 2160} \div 100 = \$40.176$, *Ans.*

10. $\overline{\$5.75 \times 3080} \div 1000 = \$17.71$, *Ans.*

11. ($11.375 × 28642) ÷ 1000 = $325.80275, *Ans.*

12. ($12.375 × 1480) ÷ 100 = $183.15, *Ans.*

13. $\overline{\$5.75 \times 3700} \div 100 = \$212.75$, *Ans.*

14. ($6.875 × 12500) ÷ 1000 = $85.9375, *Ans.*

15. ($15.50 × 527) ÷ 1000 + ($1.625 × 972) ÷ 100) = $23.96 +, *Ans.*

Art. 316.

2. ($4.75 ÷ 2) × 2.806 = $6.66425, *Ans.*

3. ($2.80 ÷ 2) × 21.672 = $30.3408, *Ans.*

4. ($51.75 ÷ 2) × 150 × .1625 = $630.703 +, *Ans.*

5. $(\overline{\$7.50 \div 2} \times 6.34) + (\overline{\$6.25 \div 2} \times 5.08) = \$39.65$, *Ans.*

6. ($26.44 ÷ 2) × 1.526 = $20.17372, *Ans.*

Art. 328.

1. ($38 ÷ 4.75) × 7.5 = $60, *Ans.*

2. ($5.635 ÷ .875) × 9.25 = $59.57, *Ans.*

3. ($54.72 ÷ 36.48) × 14.25 = $21.375, *Ans.*

4. $6.975 ÷ .93 = $7.50, *Ans.*

5. ($15.875 ÷ .125) × 25.42 = $3228.34, *Ans.*

6. ($2.856 ÷ 1680) × 2000 = $3.40, *Ans.*

7. $.625 × .8 = $.5040, *Ans.*

8. $6.25 × 186.4 = $1165, *Ans.*

9. ($121.50 ÷ 2) × 1.375 = $83.53, *Ans.*

10. $9.75 × 19.6 = $191.10, *Ans.*

11. $7.50 × .625 = $4.6875, *Ans.*

12. ($101.5 ÷ 29) × 35 = $122.5, *Ans.*

13. $9.60 ÷ 28.8 = $.33⅓, *Ans.*

14. $\$194.40 \div \overline{36 \times 36} = \$.15$, *Ans.*

15. ($1.625 × 108.6 = $176.475, *Ans.*

16. ($25.5 × 1.22) + ($2.125 × 18.66) + ($3.50 × 9.525) = $104.10, *Ans.*

17. $70.15 ÷ ($1.37 + $.95 + $.73) = 23 bu., *Ans.*

18. $4.625 + ($453.75 ÷ 27.5) = $21.125, *Ans.*

19. $645\text{ T.} - (\overline{645\text{ T.} \times .375} + \overline{645\text{ T.} \times \tfrac{5}{12}}) = 134.375\text{ T.}$

20. $\frac{16289}{20} \times \frac{847}{32} = 21557.47343$, *Ans.*

21. $55.92 ÷ ($.875 + $.1875 + $.1025) = 48 lb., *Ans.*

22. ($2.25 × 2400) − ($15.90 × 240) = $1584, *Ans.*

23. $8000 × .375 × .15 = $450, *Ans.*

24. ($6.375 × 150) + ($1.44 × 350) = $1460.25 cost;

$(\overline{\$8.25 \times 105} + \overline{\$2.06 \times 350}) - \$1460.25 = \$127$, partial gain;

($363.25 − $127) ÷ (150 − 105) = $5.25 per bbl., *Ans.*

25. ($339.625 — $78.375) ÷ 209 = $1.25, *Ans.*

26. $\frac{3}{\underset{2}{\cancel{8}}} \times \frac{\cancel{4}}{5} \times \frac{1}{2} = \frac{3}{20} = .15$, *Ans.*

27. $(\overline{\$.75 \times 28.5} + \overline{\$1.50 \times 4.53}) \div (12.52 \div 2) = \$4.50$,

28. $\$4.3125 \times \frac{58}{\cancel{8}} \times \overset{9}{\cancel{27}} = \$2251.125$, cost,

$(\$2251.125 + \$381.875 + \$9.625) \div (\frac{58}{\cancel{8}} \times \overset{9}{\cancel{27}}) = \$5.06\frac{1}{4}$.

29. ($34.125 ÷ 10.5) × 60.375 = $196.21875, *Ans.*

30. $93.50 ÷ ($12.75 ÷ 150) = 1100 lb., *Ans.*

31. $\frac{3}{10} + \frac{3}{5} = \frac{9}{10}$; $1 - \frac{9}{10} = \frac{1}{10}$, oats;

$108 ÷ ($.625 × .3 + $1.875 × .6 + $.375 × .1) = 80 bu.

32. 7.12 ÷ 4.23 = 1.6832 +, *Ans.*

33. $17.60 × (5.225 ÷ 2) = $45.98, value of the hay;

$5.25 × 2.81 = $14.7525 " " pork;

$.18 × 31 = $5.58 " " sheeting;

$4.50 × 11.5 = $51.75, " " cloth.

($45.98 + $14.7525) — ($5.58 + $51.75) = $3.40, *Ans.*

34. $(\$140.30 \div \overline{\$.95 + \$1.37 + \$.73}) \times 3 = 138$ bu., *Ans.*

35. $(\overline{\$100 \times 150} - \$3900) \div 150 = \$74$, cost per acre.

$(\overline{\$100 \times 150} - \overline{\$3900 + \$2250}) \div 150 = \$59$, sold per acre, *Ans.*

36. ($1.40 × 2500) + ($.54 × 735) = $3896.90, cost of both;

($1.40 × 1470) + $435.875 = $2593.875, sale of flour;

($.54 × 528) — $30 = $255.12, sale of oats;

$1.25 × (2500 — 1470) = $1287.50, sold remainder of wheat;

$.45 × (735 — 528) = $93.15, sold remainder of oats;

($2593.875 + $255.12 + $1287.50 + $93.15) — $3896.90 = $232.745, gain, *Ans.*

Art. 425.

2. $\overline{7\text{ lb.}\times 12}+10\text{ oz.}=94\text{ oz.}$;
$\overline{94\text{ oz.}\times 20}+16\text{ pwt.}=1896\text{ pwt.}$;
$\overline{1896\text{ pwt.}\times 24}+11\text{ gr.}=45515\text{ gr.}$, *Ans.*

3. $\overline{3\text{ T.}\times 20}+6\text{ cwt.}=66\text{ cwt.}$;
$\overline{66\text{ cwt.}\times 100}+21\text{ lb.}=6621\text{ lb.}$;
$\overline{6621\text{ lb.}\times 16}+12\text{ oz.}=105948\text{ oz.}$, *Ans.*

4. $\overline{12\text{ fath.}\times 6}+3\text{ ft.}=75\text{ ft.}$;
$\overline{75\text{ ft.}\times 12}+10\text{ in.}=910\text{ in.}$, *Ans.*

5. $\overline{6\text{ wk.}\times 7}+5\text{ da.}=47\text{ da.}$;
$\overline{47\text{ da.}\times 24}+9\text{ hr.}=1137\text{ hr.}$;
$\overline{1137\text{ hr.}\times 60}+25\text{ min.}=68245\text{ min.}$, *Ans.*

6. $\overline{12\text{ mi.}\times 320}+36\text{ rd.}=3876\text{ rd.}$;
$\overline{3876\text{ rd.}\times 16\tfrac{1}{2}}+10\text{ ft.}=63964\text{ ft.}$, *Ans.*

7. $\overline{10\text{ rd.}\times 16\tfrac{1}{2}}+5\tfrac{1}{2}\text{ ft.}=170\tfrac{1}{2}\text{ ft.}$;
$170\tfrac{1}{2}\text{ ft.}\times 12=2046\text{ in.}$, *Ans.*

8. $27\tfrac{3}{4}\text{ yd.}\times 8=222$ eighths, *Ans.*

9. $\overline{1\text{ A.}\times 160\times 30\tfrac{1}{4}}+15\text{ sq. yd.}=4855\text{ sq. yd.}$;
$4855\text{ sq. yd.}\times 9=43695\text{ sq. ft.}$, *Ans.*

10. $\overline{2\text{ sq. mi.}\times 640}+125\text{ A.}=1405\text{ A.}$;
$1405\text{ A.}\times 160=224800\text{ P.}$, *Ans.*

11. $14\text{ sq. mi.}\times 640=8960\text{ A.}$, *Ans.*

12. $\overline{3\text{ mi.}\times 80}+51\text{ ch.}=291\text{ ch.}$;
$\overline{291\text{ ch.}\times 100}+6\text{ l.}=29106\text{ l.}$, *Ans.*

13. $\overline{75\text{ Cd.}\times 8}+6\text{ cd. ft.}=606\text{ cd. ft.}$;
$606\text{ cd. ft.}\times 16=9696\text{ cu. ft.}$, *Ans.*

14. $\overline{\text{12 hhd.}\times 63}+\text{21 gal.}=\text{777 gal.}$;
777 gal. × 8 = 6216 pt., *Ans.*

15. $\overline{\text{24 bu.}\times 4}+\text{3 pk.}=\text{99 pk.}$; 99 pk. × 8 = 792 qt., *Ans.*

16. $\overline{\text{Cong. }4\times 8}+\text{O. }5=\text{O. }37$;
$\overline{\text{O. }37\times 16}+\text{f℥ }8=\text{f℥ }600$;
f℥ 600 × 8 = fʒ 4800, *Ans.*

17. 31½ gal. × 32 = 1008 gi., *Ans.*

18. $\overline{\text{7 T.}\times 20}+\text{9 cwt.}=\text{149 cwt.}$;
$\overline{\text{149 cwt.}\times 100}+\text{18 lb.}=\text{14918 lb.}$, *Ans.*

19. $\overline{\text{22 lb.}\times 12}+\text{10 oz.}=\text{274 oz.}$;
274 oz. × 20 = 5480 pwt., *Ans.*

20. $\overline{\text{℔ }16\times 12}+\text{℥}7=\text{℥}199$; $\overline{\text{℥}199\times 8}+\text{ʒ}3=\text{ʒ}1595$;
ʒ1595 × 3 = ℈4785, *Ans.*

21. 365 da. × 24 × 60 = 525600 min., *Ans.*

22. June, 30 da. + July, 31 da. + Aug., 31 da. = 92 da.;
92 da. × 24 × 60 × 60 = 7948800 sec., *Ans.*

23. 266 da. × 24 = 8784 hr., *Ans.*

24. $\overline{\text{10 S.}\times 30}+22^\circ=322^\circ$; $\overline{322^\circ\times 60}+5'=19325'$.

25. 5 bun. × 2 × 20 = 200 quires, *Ans.*

26. 6 Gr. gross × 12 × 12 = 864 doz., *Ans.*

27. 326½ sov. × 240 = 78360d., *Ans.*

28. 26½ fr. × 100 = 2650 centimes, *Ans.*

29. £34½ × 240 = 8280d., *Ans.*

30. 5 lb. 9 oz. 14 pwt. = 1394 pwt.;
$.75 × 1394 = $1045.50, *Ans.*

31. $\frac{3}{\cancel{4}}$ mi. × $\cancel{4}$=3 mi. ; 3 mi. × 320=960 rd., *Ans.*

32. $\overline{2\text{ bu.}\times 4}+3$ pk.=11 pk. ;
$\overline{1548\text{ bu.}\times 4}+1$ pk.=6193 pk. ;
6193 pk.÷11 pk.=563 bbl., *Ans.*

33. $\overline{9\text{ cwt.}\times 1000}+60$ lb.=960 lb. ;
960 lb.÷12=80 boxes, *Ans.*

34. \$4.75 × 9=\$42.75 ; 9 bu. × 64=576 pt. ;
\$.125 × 576=\$72 ; \$72−\$42.75=\$29.25, *Ans.*

35. 42 mi. × 5280+221760 ft. ;
221760 ft.÷16.5 ft.=13440 times, *Ans.*

36. Summer, or spring months=132480 min. ;
Autumn=131040 min. ;
132480 min.−131040 min.=1440 min., *Ans.*

37. $\overline{4\text{ rm.}\times 20}+10$ qr.=90 qr. ;
90 qr. × 24=2160 sheets, *Ans.*

38. 2 Gr. gross × 144=288 bk. ; \$.125 × 288=\$36, *Ans.*

39. 28 da. × 24 × 60 × 60=2419200 times, *Ans.*

40. $\overline{21\text{ yr.}\times 365}+26$ da.+5 da.=7696 da. ;
7696 da. × 24 × 60=11082240 min., *Ans.*

41. 120 lea. × 3 × 1.15=414 statute mi., *Ans.*

42. 31½ gal. × 8=252 pt. ; 1 qt.=2 pt. ; 2 qt.=4 pt. ;
252 pt.÷(1 pt.+2 pt.+4 pt.)=36 bottles, *Ans.*

43. $\overline{100\text{ yr.}\times 365}+24$ da.=36524 da. ;
36524 da. × 24=876576 hr., *Ans.*

44. $\overline{2\text{ bales}\times 5}+2$ bun.=12 bun. ;
$\overline{12\text{ bun.}\times 40}+15$ qr.=495 qr, ;
495 qr. × 24=11880 sh. ;
11880 sh.÷8 sh.=1485 copies, *Ans.*

45. 16 sh. × 8 × 2 = 256 pages, ***Ans.***

46. 36.25 cent. × 100 = 3625 pounds, ***Ans.***

47. $42\frac{4}{7}$ bbl. × 196 = 8344 pounds, ***Ans.***

48. 29.5 quint. × 100 = 2950 pounds, ***Ans.***

49. 116.5 bbl. × 280 = 3262 pounds, ***Ans.***

50. 63.25 kegs × 100 = 6325 pounds, ***Ans.***

51. 75 bu. × .75 × 56 = 3150 pounds, ***Ans.***

52. 125.75 bu. × 60 = 7545 pounds, ***Ans.***

53. 14432 bu. × 32 = 461824 pounds, ***Ans.***

54. 40 bu. × .7 × 50 = 1400 pounds, ***Ans.***

55. 7.5 casks × 240 = 1800 pounds, ***Ans.***

56. 28 sov. × 4.8665 = $136.262, ***Ans.***

57. £25.5 × 4.8665 = $124.09575, ***Ans.***

58. $.193 × 25 = $4.825, ***Ans.***

59. $.2385 × 42.5 = $10.13625, ***Ans.***

Art. 428.

5. 3168000 in. ÷ 63360 in. = 50 mi., ***Ans.***

6. 256800 P. ÷ 160 P. = 1605 A., ***Ans.***

7. 27878400 sq. ft. ÷ 27878400 sq. ft. = 1 sq. mi., ***Ans.***

8. 216840 cu. in. ÷ 1728 cu. in. = $125\frac{35}{72}$ cu. ft., ***Ans.***

9. 38042 cu. ft. ÷ 16 cu. ft. = 2377 cd. ft. 10 cu. ft.;
2377 cd. ft. ÷ 8 cd. ft. = 297 Cd. 1 cd. ft.;
297 Cd. 1 cd. ft. 10 cu. ft., ***Ans.***

10. 30876 gi.÷4 gi.=7719 pt.;
7719 pt.÷2 pt.=3859 qt. 1 pt.;
3859 qt.÷4 qt.=964 gal. 3 qt.;
964 gal.÷63 gal.=15 hhd. 19 gal.;
15 hhd. 19 gal. 3 qt. 1 pt., *Ans.*

11. 27072 qt.÷32 qt.=846 bu., *Ans.*

12. 66742 pt.÷2 pt.=33371 qt.;
33371 qt.÷4 qt.=8342 gal. 3 qt.;
8342 gal.÷31½ gal.=264 bbl. 26 gal.;
264 bbl. 26 gal. 3 qt., *Ans.*

13. 103720 pt.÷8 pt.=12965 gal., *Ans.*

14. f℥ 8106÷f℥ 16=O. 506 f℥ 10;
O. 506÷O. 8=Cong. 63 O. 2 ;
Cong. 63 O. 2 f℥ 10, *Ans.*

15. 85894 gr.÷24 gr.=3578 pwt. 22 gr.;
3578 pwt.÷20 pwt.=178 oz. 18 pwt.;
178 oz.÷12 oz.=14 lb. 10 oz.;
14 lb. 10 oz. 18 pwt. 22 gr., *Ans.*

16. 51570 lb.÷100 lb.=515 cwt. 70 lb.;
515 cwt.÷20 cwt.=25 T. 15 cwt.;
25 T. 15 cwt. 70 lb., *Ans.*

17. 40607 oz.÷16 oz.=2537 lb. 15 oz.;
2537 lb.÷100 lb.=25 cwt. 37 lb.;
25 cwt. 37 lb. 15 oz., *Ans.*

18. 3000 pwt.÷20 pwt.=150 oz.;
150 oz.÷12 oz.=12 lb. 6 oz., *Ans.*

19. 12060 lb.÷60 lb.=201 bu., *Ans.*

20. *3038 lb.*÷196 lb.=15 bbl. 98 lb., *Ans.*

21. 6496 lb.÷32 lb.=203 bu., *Ans.*

22. 3172 lb.÷100 lb.=31 quin. 72 lb., *Ans.*

23. 3114061 sec.÷60 sec.=51901 min. 1 sec.;
51901 min.÷60 min.=865 hr. 1 min.;
865 hr.÷24 hr.=36 da. 1 hr.;
36 da.÷7 da.=5 wk. 1 da.;
5 wk. 1 da. 1 hr. 1 min. 1 sec., *Ans.*

24. 8263420 min.÷60 min.=137723 hr. 40 min.;
137723 hr.÷24 hr.=5738 da. 11 hr.;
5738 da.÷30 da.=191 mo. 8 da.;
191 mo. 8 da. 11 hr. 40 min., *Ans.*

25. 2007200″÷60″=33453′ 20″;
33453′÷60′=557° 33′; 557° 33′ 20″, *Ans.*

26. 5270 N. mi.÷60 N. mi.=87 deg. 50 N. mi., *Ans.*

27. 120400 pens÷144 pens=836 gro. 16 pens, *Ans.*

28. 2734 eggs÷12 eggs=227 doz. 10 eggs, *Ans.*

29. 5020 balls÷20 balls=251 scores, *Ans.*

30. 10738 sh.÷24 sh.=447 qr. 10 sh.;
447 qr.÷20 qr.=22 rm. 7 qr.;
22 rm. 7 qr. 10 sh., *Ans.*

31. 6048 qr.÷20 qr.=302 rm. 8 qr.;
302 rm.÷2 rm.=151 bun.; 151 bun. 8 qr., *Ans.*

32. 24684d.÷12d.=2057s.; 2057s.÷5s.=411 cr. 2s.

33. 4076s.÷2s.=2038 florins, *Ans.*

34. $194.66÷$2.43325=80 half-sovereigns, *Ans.*

35. 42346 far.÷4 far.=10586d. 2 far.;
10586d.÷12d.=882s. 2d.; 882s.÷20s.=£44 2s.;
£44 2s. 2d. 2 far., *Ans.*

36. \$86.85÷\$.193=450 francs, *Ans.*

37. \$225.40 ÷ \$4.8665 = 46.316 sov. = 46 sov. 6s. 3d. 3 far.+, *Ans.*

38. \$47.70÷\$.2385=200 marks, *Ans.*

39. \$.10 × 5280 × 3200=\$1689600, *Ans.*

40. 175 lb. × 27=4725 lb., *Ans.*

41. \$.56 × (1860÷32)=\$32.549, *Ans.*

42. 423 mi.÷60=7° 3′, *Ans.*

43. $(25 \text{ min.}+20 \text{ min.})+(\overline{40\times365}+9)=657405$ min.; 657405 min.=456 da. 12 hr. 45 min., *Ans.*

44. \$.125 × 15=\$1.875, *Ans.*

45. \$1.20 × (2000÷50)=\$48, *Ans.*

46. $(\$.62\times\overline{2496\div52})+(\$.44\times\overline{1920\div32})=\$56.16.$

Art. 431.

2. $\frac{1}{\underset{4}{\cancel{132}}}$ rd. $\times\frac{\cancel{33}}{\cancel{2}}\times\frac{\cancel{3}}{1}=\frac{1}{8}$ ft., *Ans.*

3. $\frac{1}{\underset{2}{\cancel{960}}}$ oz. $\times\frac{\cancel{20}}{1}\times\frac{\cancel{24}}{1}=\frac{1}{2}$ gr., *Ans.*

4. $\frac{1}{\underset{4}{\cancel{672}}}$ hhd. $\times\frac{\overset{3}{\cancel{63}}}{1}\times\frac{\cancel{4}}{1}\times\frac{\cancel{2}}{1}=\frac{3}{4}$ pt., *Ans.*

5. £.012 × 20=24s., *Ans.*

6. $\frac{3}{\underset{80}{\cancel{1280}}}$ lb. $\times\frac{\cancel{16}}{1}=\frac{3}{8}$ oz., *Ans.*

7. $\frac{7}{\underset{9}{\cancel{1440}}}$ A. $\times\frac{\cancel{160}}{1}=\frac{7}{9}$ sq. rd., *Ans.*

8. .005 bu. × 4 × 8 × 2=.32 pt., *Ans.*

9. $\frac{\overset{12}{\cancel{24}}}{\underset{7}{\cancel{77}}}$ rd. $\times\frac{\cancel{11}}{\cancel{2}}=1\frac{5}{7}$ yd., *Ans.*

10. .0000625 mi. × 5280=.33 ft., *Ans.*

11. $\frac{2}{\underset{9}{\cancel{27}}}$ lb. $\times\frac{\overset{4}{\cancel{12}}}{1}=\frac{8}{9}$ oz., *Ans.*

12. $\frac{1}{\underset{6}{\cancel{2112}}}$ mi. $\times\frac{\overset{5}{\cancel{320}}}{1}\times\frac{\cancel{11}}{2}=\frac{5}{6}$ yd., *Ans.*

13. $\frac{1}{\underset{9}{\cancel{45}}}$ rd. $\times\frac{\overset{5}{\cancel{25}}}{1}=\frac{5}{9}$ l., *Ans.*

14. .000175 da. × 24 × 60 = .252 min., *Ans.*

15. $\frac{27}{\underset{323}{\cancel{25840}}}$ A. $\times\frac{\overset{2}{\cancel{160}}}{1}=\frac{54}{323}$ sq. rd., *Ans.*

Art. 433.

2. £$\frac{13}{\underset{6}{\cancel{24}}}\times\frac{\overset{5}{\cancel{20}}}{1}=10\frac{5}{6}$s.; $\frac{5}{\cancel{6}}$s. $\times\frac{\overset{2}{\cancel{12}}}{1}=10$d.; 10s. 10d., *Ans.*

3. .35℔ × 12 = ℥4.2; ℥.2 × 8 = ʒ1.6; ʒ.6 × 3 = ℈1.8;
℈.8 × 20 = gr. 16; ℥4 ʒ1 ℈1 gr. 16, *Ans.*

4. $\frac{4}{\underset{3}{\cancel{15}}}$ mi. $\times\frac{\overset{64}{\cancel{320}}}{1}=85\frac{1}{3}$ rd.; $\frac{1}{\cancel{3}}$ rd. $\times\frac{\overset{33}{\cancel{33}}}{2}=5\frac{1}{2}$ ft.;
$\frac{1}{\cancel{2}}$ ft. $\times\frac{\overset{6}{\cancel{12}}}{1}=6$ in.; 85 rd. 5 ft. 6 in., *Ans.*

5. .75 lb. × 12 = 9 oz., *Ans.*

6. .625 fath. × 6 = 3.75 ft.; .75 ft. × 12 = 9 in.;
3 ft. 9 in., *Ans.*

7. .55 lb. × 16 = 8.8 oz., *Ans.*

8. $\frac{4}{7}$ mo. $\times\frac{30}{1}=17\frac{1}{7}$ da.; $\frac{1}{7}$ da. $\times\frac{24}{1}=3\frac{3}{7}$ hr.;
$\frac{3}{7}$ hr. $\times\frac{60}{1}=25\frac{5}{7}$ min.; $\frac{5}{7}$ min. $\times\frac{60}{1}=42\frac{6}{7}$ sec.;
17 da. 3 hr. 25 min. $42\frac{6}{7}$ sec., *Ans.*

9. £.555 × 20 = 11.1s.; 1s. × 12 = 1.2d.; 11s. 1.2d., *Ans.*

10. $\frac{7}{13}$ A. $\times\frac{160}{1}=86\frac{2}{13}$ P.; $\frac{\cancel{2}}{\underset{2}{13}}$ P. $\times\frac{121}{\underset{4}{\cancel{4}}}=4\frac{7}{26}$ sq. yd.;
$\frac{7}{26}$ sq. yd. $\times\frac{9}{1}=2\frac{11}{26}$ sq. ft.;
$\frac{11}{26}$ sq. ft. $\times\frac{144}{1}=60\frac{12}{13}$ sq. in.;
86 P. 4 sq. yd. 2 sq. ft. $60\frac{12}{13}$ sq. in., *Ans.*

11. $\dfrac{5}{\underset{3}{\cancel{12}}}$ lb. $\times\dfrac{\overset{4}{\cancel{16}}}{1}=6\frac{2}{3}$ oz., *Ans.*

12. $\dfrac{8}{\underset{5}{\cancel{15}}}$ cu. yd. $\times\dfrac{\overset{9}{\cancel{27}}}{1}=14\frac{2}{5}$ cu. ft.;
$\frac{2}{5}$ cu. ft. $\times\frac{1728}{1}=691\frac{1}{5}$ cu. in.;
14 cu. ft. $691\frac{1}{5}$ cu. in., *Ans.*

13. .1934 S. × 30 = 5.802° ; .802° × 60 = 48.12′ ;
.12′ × 60 = 7.2″ ; 5° 48′ 7.2″, *Ans.*

14. f℥ .7 × 8 = fʒ 5.6 ; fʒ .6 × 60 = ♏ 36 ; fʒ 5 ♏ 36.

15. $\dfrac{607}{\underset{32}{\cancel{640}}}$ T. $\times\dfrac{\cancel{20}}{1}\times18\frac{31}{32}$ cwt.; $\frac{31}{32}$ cwt. $\times\frac{100}{1}=96\frac{7}{8}$ lb.;
$\frac{7}{\cancel{8}}$ lb. $\times\frac{\cancel{16}}{1}=14$ oz.; 18 cwt. 96 lb. 14 oz., *Ans.*

16. .875 hhd. × 63 = 55.125 gal.; .125 gal. × 4 = .5 qt.;
.5 qt. × 2 = 1 pt.; 55 gal. 1 pt., *Ans.*

17. $\frac{5}{9}$ sq. rd. $\times\frac{121}{4}=16\frac{29}{36}$ sq. yd.;
$\dfrac{29}{\underset{4}{\cancel{36}}}$ sq. yd. $\times\frac{\cancel{9}}{1}=7\frac{1}{4}$ sq. ft.; $\frac{1}{\cancel{4}}$ sq. ft. $\times\dfrac{\overset{36}{\cancel{144}}}{1}=36$ sq. in.;
16 sq. yd. 7 sq. ft. 36 sq. in., *Ans.*

18. ℔ $\dfrac{15}{\underset{11}{\cancel{22}}}-\dfrac{\overset{6}{\cancel{12}}}{1}=$ ℥ $8\frac{2}{11}$; ℥ $\frac{2}{11}\times\frac{8}{1}=$ ʒ $1\frac{5}{11}$;
ʒ $\frac{5}{11}\times\frac{3}{1}=$ ℈ $1\frac{4}{11}$; ℈ $\frac{4}{11}\times\frac{20}{1}=$ gr. $7\frac{2}{11}$;
℥ 8 ʒ 1 ℈ 1 gr. $7\frac{3}{11}$, *Ans.*

19. $\frac{4}{7}$ Gr. gro. $\times\frac{12}{1}=6\frac{6}{7}$ gro.; $\frac{6}{7}$ gro. $\times\frac{12}{1}=10\frac{2}{7}$ doz.;
$\frac{2}{7}$ doz. $\times\frac{12}{1}=3\frac{3}{7}$ units; 6 gro. 10 doz. $3\frac{3}{7}$ units, *Ans.*

20. .67 lea. × 3 = 2.01 geo. mi.;
2.01 geo. mi. × 1.15 = 2.3115 com. mi.;
.3115 com. mi. × 320 = 99.68 rd.;
.68 rd. × $16\frac{1}{2}$ = 11.22 ft.; .22 ft. × 12 = 2.04 in.;
2 mi. 99 rd. 11 ft. 2.64 in., *Ans.*

21. .125 bbl. × $31\frac{1}{2}$ = 3.9375 gal.; .9375 gal. × 4 = 3.75 qt.;
.75 qt. × 2 = 1.5 pt.; .5 pt. × 4 = 2 gi.;
3 gal. 3 qt. 1 pt. 2 gi., *Ans.*

22. .578125 bu. × 4 = 2.3125 pk.; .3125 pk. × 8 = 2.5 qt.;
.5 qt. × 2 = 1 pt.; 2 pk. 2 qt. 1 pt., *Ans.*

23. .6625 mi. × 320 = 212 rd., *Ans.*

24. $\frac{11}{2}$ T. × $\frac{7}{9}$ = $4\frac{5}{18}$ T.; $\frac{5}{\underset{9}{\cancel{18}}}$ T. × $\frac{\overset{10}{\cancel{20}}}{1}$ = $5\frac{5}{9}$ cwt.;
$\frac{5}{9}$ cwt. × $\frac{100}{1}$ = $55\frac{5}{9}$ lb.; $\frac{5}{9}$ lb. × $\frac{16}{1}$ = $8\frac{8}{9}$ oz.;
4 T. 5 cwt. 55 lb. $8\frac{8}{9}$ oz., *Ans.*

25. $\frac{11}{\cancel{3}}$ A. × $\frac{\cancel{3}}{8}$ = $1\frac{3}{8}$ A.; $\frac{3}{\cancel{8}}$ A. × $\frac{\overset{20}{\cancel{160}}}{1}$ = 60 P.;
1 A. 60 P., *Ans.*

26. $\frac{27}{\underset{2}{\cancel{8}}}$ Cd. × $\frac{\cancel{4}}{5}$ = 2.7 Cd.; .7 Cd. × 128 = 89.6 cu. ft.;
2 Cd. 89.6 cu. ft., *Ans.*

27. .225 mi. × $\frac{4}{5}$ = .18 mi.; .18 mi. × 320 = 57.6 rd.;
.6 rd. × $16\frac{1}{2}$ = 9.9 ft.; .9 ft. × 12 = 10.8 in.;
57 rd. 9 ft. 10.8 in., *Ans.*

28. .3125 rm. × 20 = 6.25 qr.; 25 qr. × 24 = 6 sh.;
6 qr. 6 sh., *Ans.*

29. $\frac{13}{\cancel{40}}$ T. × $\frac{\overset{50}{\cancel{2000}}}{1}$ = 650 lb.; \$.08$\frac{1}{3}$ × 650 = \$54.16$\frac{2}{3}$, *Ans.*

Art. 435.

2. $\frac{\cancel{8}}{11}$ gi. × $\frac{1}{\cancel{4}}$ × $\frac{1}{\cancel{2}}$ × $\frac{1}{4}$ = $\frac{1}{44}$ gal., *Ans.*

3. $\frac{\cancel{2}}{9}$s. × $\frac{1}{\underset{10}{\cancel{20}}}$ = £$\frac{1}{90}$, *Ans.*

4. .64 pt. ÷ 64 pt. = .01 bu., *Ans.*

5. .576 gr. ÷ 5760 gr. = .0001 lb., *Ans.*

6. .8 lb. × 2000 lb. = .0004 T., *Ans.*
.36 cwt. ÷ 20 cwt. = .018 T., *Ans.*

7. $\frac{\overset{3}{\cancel{12}}}{49}$ cd. ft. $\times \frac{1}{\underset{2}{\cancel{8}}} = \frac{3}{98}$ Cd., *Ans.*

8. .216 gr. ÷ 480 gr. = .00045 oz., *Ans.*

9. $\frac{\cancel{5}}{7}$ lb. $\times \frac{1}{\underset{400}{\cancel{2000}}} = \frac{1}{2800}$ T., *Ans.*

10. $\frac{\cancel{3}}{4}$ min. $\times \frac{1}{\underset{20}{\cancel{60}}} \times \frac{1}{\underset{8}{\cancel{24}}} = \frac{1}{640}$ da., *Ans.*
.12 hr. ÷ 24 hr. = .005 da., *Ans.*

11. 3.96 in. ÷ 198 in. = .02 rd., *Ans.*

12. $\frac{1}{\underset{85}{\cancel{680}}}$ hhd. $\times \frac{63}{1} \times \frac{\cancel{4}}{1} \times \frac{\cancel{2}}{1} = \frac{63}{85}$ pt.;
$\frac{63}{85}$ pt. $- \frac{3}{5}$ pt. $= \frac{12}{85}$ pt., *Ans.*

13. $\frac{7}{9}$ sq. rd. $\times \frac{1}{160} = \frac{7}{1440}$ A., *Ans.*

Art. 437.

2. 3 gal. 3 qt. $1\frac{1}{2}$ pt. = 63 half pt.; 1 bbl. = 504 half pt.;
$\frac{63}{504}$ bbl. $= \frac{1}{8}$ bbl., *Ans.*

3. 8 cu. ft. ÷ 16 cu. ft. = .5 cd. ft.;
3.5 cd. ft. ÷ 8 cd. ft. = .4375 Cd., *Ans.*

4. 3.62 gi. ÷ 4 gi. = .905 pt.; .905 pt. ÷ 2 pt. = .4525 qt.;
3.4525 qt. ÷ 4 qt. = .863125 gal.;
13.863125 gal. ÷ 63 gal. = .22 hhd. +, *Ans.*

5. 10 oz. 13 pwt. 9 gr. = 5121 gr.; 1 lb. = 5760 gr.;
$\frac{5121}{5760}$ lb. $= \frac{569}{640}$ lb., *Ans.*

6. 2 T. 7 cwt. 28 lb. = 4728 lb.;
5 cwt. 91 lb. = 591 lb.; $\frac{591}{4728} = \frac{1}{8}$, *Ans.*

7. 3 A. 20 P. = 500 P.; 51.52 P. ÷ 500 P. = .100304.

8. fʒ ♏ 36 = ♏ 336; f℥ 1 = ♏ 480; f℥ $\frac{336}{480}$ = f℥ .7.

9. 12 P. ÷ 16 P. = .75 sq. ch.; 4.75 sq. ch. ÷ 10 = .475 A.;
126.475 A. ÷ 640 A. = .1976171875 sq. mi.;
.1976171875 sq. mi. ÷ 36 sq. mi. = .0054893663 Tp.

10. 25° 42′ 40″ = 92560″; 7° 42′ 48″ = 27768″;
27768″ ÷ 92560″ = .3, *Ans.*

11. 28 gal. 2 qt. = 114 qt.; 1 hhd. = 252 qt.;
252 qt. − 114 qt. = 138 qt.; $\frac{138}{252}$ hhd. = $\frac{23}{42}$ hhd., *Ans.*

12. 3.6 in. ÷ 36 in. = .1 yd.; 1.1 yd. ÷ 5½ yd. = .2 rd.;
3.2 rd. ÷ 320 rd. = .01 com. mi.;
2.01 com. mi. ÷ 1.15 com. mi. = 1.74782 geo. mi.;
1.74782 geo. mi. ÷ 3 geo. mi. = .5826 lea., *Ans.*

13. 110 lb. 4 oz. = 1764 oz.; 3 bbl. = 9408 oz.;
$\frac{1764}{9408}$ bbl. = $\frac{3}{16}$ bbl., *Ans.*

14. $\frac{\overset{13}{\cancel{52}}}{4}$ lb. × $\frac{1}{\cancel{4}}$ = 3.25 lb.; 3.25 lb. ÷ 100 lb. = .0325 cwt.;
.0325 cwt. ÷ 20 cwt. = .001625 T., *Ans.*

15. .45 pk. ÷ 4 pk. = .1125 bu.;
.1125 bu. ÷ 1.25 bu. = .09 bu., *Ans.*

16. 54 Cd. = 6912 cu. ft.; $\frac{4800}{6912}$ Cd. = $\frac{25}{36}$ Cd., *Ans.*

17. 18s. 5d. $2\frac{2}{13}$ far. = $\frac{11520}{13}$ far.;
£1 = $\frac{12480}{13}$ far.; £$\frac{11520}{12480}$ = £$\frac{12}{13}$, *Ans.*

Art. 438.

1. (21 mi. × 63360) ÷ 30 in. = 44352 steps, *Ans.*

2. 60° = 216000″; 3′ 12″ = 192″;
216000″ ÷ 192″ = 18 hr. 45 min., *Ans.*

3. £10.925 × 4.8665 = $53.1665125, *Ans.*

4. ($.125 × 5000) — $425.75 = $199.25, *Ans.*

5. 580 fr. × .193 = $111.94, *Ans.*

6. $291.99 ÷ $4.8665 = £60, *Ans.*

7. $4.20 × 30.53125 = 128.23\frac{1}{8}$, *Ans.*

8. $.0625 × (1522 + 636) — ($\overline{\$4.25 \times 15.22}$ + $\overline{\$5.60 \times 6.36}$) = $34.574, *Ans.*

9. 36824 lb. ÷ 52 lb. = 708$\frac{2}{13}$ bu., Ill.;
36824 lb. ÷ 56 lb. ÷ 657$\frac{4}{7}$ bu., La.;
36824 lb. ÷ 58 lb. = 634$\frac{26}{29}$ bu., N. Y., *Ans.*

10. (5000 bu. × 32) ÷ 28 lb. = 5714$\frac{2}{7}$ bu., Ct.;
(5000 bu. × 32) ÷ 30 lb. = 5333$\frac{1}{3}$ bu., N. J., *Ans.*

11. 16 T. 3 cwt. 3 qr. 24 lb. = 36284 lb.;
3d. × 36284 = 108852d.; 108852d. = £453.55;
£453.55 × 4.8665 = $2207.201075;
26284 lb. = 18.142 *short* T.;
$140 × 18.142 = $2539.88;
$2539.88 — $2207.201075 = $332.679, gain, *Ans.*

12. $\frac{5}{\cancel{8}} \times \frac{\overset{3}{\cancel{24}}}{1}$ = 15 carats, *Ans.*

13. (105.85 ch. × 40.15) ÷ 10 = 424.98775 A., *Ans.*

14. (90000 lb. ÷ 10 lb.) ÷ 100 = $90, *Ans.*

15. $75.75 × ($\overline{189.5 \text{ rd.} \times 150}$ ÷ 160 sq. rd.) = $13457.45, *Ans.*

16. 2 bu. 3 pk. 6 qt. = 11.75 pk.; $.30 × 11.75 = $3.525.

17. $22.75 × 3.86 = $87.815, *Ans.*

18. 2 cwt. 10 lb. = 210 lb.; 3 bbl. × 210 = 630 lb.;
630 half-oz. = 19.6875 lb.; $.125 × 19.6875 = $2.46.

19. 37 A. 128 P. = 6048 P.; 170 A. 16 P. = 27216 P.;
27216 P. — 6048 P. = 21168 P.; $\frac{21168}{27216} = \frac{7}{9}$, *Ans.*

20. $3\frac{1}{2}$ T.$=$7000 lb.; \$.095 × 7000$=$\$665;
\$665$-$\$526.05$=$\$138.95, *Ans.*

21. (2500 bu. × 35) ÷ 28 lb.$=$3125 bu., *Ans.*

22. (1500 bu. × 48) ÷ 100 lb.$=$720 centals, *Ans.*

23. $(\overline{\$3.5 \times 12.9375} \div \$.04) \div 196$ lb.$=5\frac{38}{49}$ bbl., *Ans.*

24. 3 T. 12 cwt. 20 lb.$=$7220 lb.; 5 T. 80 lb.$=$10080 lb.;
$\frac{7220}{10080}=\frac{361}{504}$; $\$15.75 \times \frac{504}{361}=\$21.988+$, *Ans.*

25. 37 Cd. 48 cu. ft.$=$4784 cu. ft.;
13 Cd. 59 cu. ft.$=$1723 cu. ft.; $\frac{1723}{4784}$, *Ans.*

26. 58.625 gal. × 2$=$117.25 gal.;
117.25 gi.$=$3.6640625 gal.;
\$.80 × 3.6640625$=\$2.93\frac{1}{8}$, *Ans.*

27. (4500 sub. × 52) ÷ (24 sh. × 20)$=487\frac{1}{2}$ reams, *Ans.*

28. (336 pp. ÷ 24) × 10000$=$140000 sh.;
140000 sh. ÷ (24 sh. × 20)$=291\frac{2}{3}$ rm.;
$291\frac{2}{3}$ qr.$=14\frac{7}{12}$ rm.;
$291\frac{2}{3}$ rm.$+14\frac{7}{12}$ rm.$=306\frac{1}{4}$ reams, *Ans.*

Art. 441.

3.

$$\begin{array}{rrr}
42 \text{ Cd.} & 5 \text{ cd. ft.} & 0 \text{ cu. ft.} \\
16 & 6 & 12 \\
\hline
25 & 6 & 4, \textit{ Ans.}
\end{array}$$

4. $\frac{\frac{15}{4}}{8}$ mi. $\times \frac{8}{7}=$1 mi. 22 rd. 14 ft. $1\frac{5}{7}$ in.

$$\begin{array}{lcrrrr}
17\frac{1}{7} \text{ rd.} & = & & 17 & 2 & 4\frac{2}{7} \\
\hline
 & & 1 & 39 & 16 & 6 \\
120\frac{1}{8} \text{ rd.} & = & & 120 & 5 & 6 \\
\hline
 & & & 239 & 11 & 0, \text{ Ans.}
\end{array}$$

5. $8\frac{9}{10}$ cwt. = 8 cwt. 90 lb. 0 oz.
$48\frac{3}{8}$ lb. = 48 6
8 41 10, *Ans.*

6. £$\frac{5}{9}$ = 11s. $1\frac{1}{3}$d.
$\frac{\cancel{3}}{\underset{2}{\cancel{4}}}$s. $\times \frac{\cancel{2}}{\cancel{3}}$ = 6
10 $7\frac{1}{3}$, *Ans.*

7. 5 lb. 4 oz. 8 pwt.
$\frac{3}{40}$ lb. = 18
5 3 10, *Ans.*

8. 2 wk. $3\frac{5}{6}$ da. = 2 wk. 3 da. 20 hr. 0 min. 0 sec.
.659 wk. = 4 14 42 43.2
1 6 5 17 16.8, *Ans.*

9. $\frac{117}{224}$ hhd. = 32 gal. 3 qt. 1 pt. 1 gi.
3 2 1 0
29 1 0 1, *Ans.*

10. $\frac{2}{3}$ lea. = 2 geo. mi. = 2 com. mi. 102 rd. 6 ft. 7.2 in.
224 0 0
1 198 6 7.2

11. $\frac{5}{8}$ gro. = $7\frac{1}{2}$ doz.; $7\frac{1}{2}$ doz. − $\frac{2}{3}$ doz. = $6\frac{5}{6}$ doz., *Ans.*

12. ℥4 ʒ0 ℈0
2 1
3 5 2, *Ans.*

13. $\frac{1}{4}$ wk. = 1 da 18 hr. 0 min.
.9 da. = 21 36
20 24, *Ans.*

14. $\frac{15}{16}$ A.=150 P.; 150 P.—84.56 P.=65.44 P., ***Ans.***

15.	14 gal.	1 qt.	1 pt.	63 gal.	0 qt.	0 pt.
	10	3	0	54	0	2
	29	0	1	8	3	0, ***Ans.***
	54	0	2;			

16.	75 A.	136.4 P.	250 A.	0 P.
	56	123.3	132	99.7
	132	99.7;	117	60.3=117.376875 A.;

$62.25 × 117.376875=$7306.71+, ***Ans.***

17.	1 T.	11 cwt.	30 lb.
$\frac{4}{5}$ long T.=		17	92
		13	38, ***Ans.***

18.	26 Cd.	7 cd. ft.	0 cu. ft.			
	30	4	10	125 Cd.	6 cd. ft.	0 cu. ft.
	37	4	8	95	0	2
	95	0	2;	30	5	14, ***Ans.***

Art. 442.

2.	1783 yr.	1 mo.	20 da.
	1775	4	19
	7	9	1, ***Ans.***

3.	1865 yr.	4 mo.	9 da.
	1861	4	11
	3	11	28, ***Ans.***

4.	1875 yr.	7 mo.	10 da.
	1873	1	16
	2	5	24, ***Ans.***

5. May, 31 da.—28 da. = 3 da.;
From June 1 to Feb. 10 = 255
258, *Ans.*

6.	1876 yr.	7 mo.	15 da.	15 hr.
	1874	9	3	9
	1	10	12	6, *Ans.*

8. June, 30 da.—20 da. = 10 da.;
From July 1 to Jan. 10 = 194
204, *Ans.*

9. January, 31 da.—10 da. = 21 da.;
From Feb. 1, 1876, to June 16 = 137
158, *Ans.*

10.	1875 yr.	12 mo.	12 da.	19 hr.	38 min.
	1873	7	4	10	16
	2	5	8	9	22, *Ans.*

11.	1878 yr.	1 mo.	1 da.	16 hr.	55 min.	24 sec.
	1875	4	21	12	40	25
	2	8	10	4	14	59, *Ans.*

Art. 443.

2.	2 bu.	3 pk.	6 qt.
			9
	26	1	6, *Ans.*

3.	3 Cd.	36 cu. ft.
		12
	39	48 = 3 cd. ft., *Ans.*

4. (8 gal. 3 qt. 1 pt. 3.25 gi.) × 12 = 107 gal. 2 qt. 1 pt. 3 gi.;
(107 gal. 2 qt. 1 pt. 3 gi.) × 8 = 13 hhd. 42 gal. 3 qt.

5. (42 bu. 1 pk. 5 qt. 1 pt.) × 8 = 339 bu. 1 pk. 4 qt.;
(339 bu. 1 pk. 4 qt.) × 8 = 2715 bushels, *Ans.*

6. (O. 8 f℥ 9 fʒ 6 ♏ 34) × 6 = O. 51 f℥ 10 fʒ 7 ♏ 24;
(O. 51 f℥ 10 fʒ 7 ♏ 24) × 4 = Cong. 25 O. 6 f℥ 11 fʒ 5 ♏ 36, *Ans.*

7. (£1 8s. 9½d.) × 12 = £17 5s. 6d.;
(£17 5s 6d.) × 7 = £120 18s. 6d., *Ans.*

8. $4800 ÷ $80 = 60;
(3 A. 24 P.. 20 sq. yd. 4 sq. ft.) × 60 = 189 A. 40 P. 16 sq. yd. 6 sq. ft., *Ans.*

10. (1 T. 6 cwt. 2 qr. 26 lb. 10 oz.) × 8 = 10 T. 13 cwt. 3 qr. 17 lb.;
(10 T. 13 cwt. 3 qr. 17 lb.) × 8 = 85 T. 11 cwt. 24 lb.;
(1 T. 6 cwt. 2 qr. 26 lb. 10 oz.) × 3 = 4 T. 23 lb. 14 oz.;
(85 T. 11 cwt. 24 lb.) + (4 T. 23 lb. 14 oz.) = 89 T. 11 cwt. 1 qr. 19 lb. 14 oz., *Ans.*

11. (4 yd. 1 ft. 4.7 in.) × 5 = 22 yd. 11.5 in.;
(22 yd. 11.5 in.) × 5 = 110 yd. 4 ft. 9.5 in.;
(110 yd. 4 ft. 9.5 in.) × 5 = 557 yd. 2 ft. 11.5 in., *Ans.*

12. 7 T. 15 cwt. 10.5 lb.
1.7
12.9 5.5 17.85 = 13 T. 3 cwt. 67.85 lb., *Ans.*

13. 28 gal. 2 qt. 1 pt.
5
143 0 1 = 143⅛ gal.;
$1.375 × 143⅛ = $196.796 +, *Ans.*

14. 41 bu. 3 pk.
4
167 0; \$.75 × 167 = \$125.25, *Ans.*

Art. 444.

2. 7) 358 A. 57 P. 6 sq. yd. 2 sq. ft.
51 31 0 8, *Ans.*

3. 5) £35 9s. 7d.
7 1 11, *Ans.*

7) £35 9s. 7d.
5 1 $4\frac{3}{7}$, *Ans.*

8) £35 9s. 7d.
4 8 $8\frac{3}{8}$, *Ans.*

4. 9) 282 bu. 3 pk. 1 qt. 1 pt.
31 1 5 1, *Ans.*

10) 282 bu. 3 pk. 1 qt. 1 pt.
28 1 0 1.9, *Ans.*

12) 282 bu. 3 pk. 1 qt. 1 pt.
23 2 2 $\frac{1}{4}$, *Ans.*

5. 7) 254 yd. 4 ft. $3\frac{1}{3}$ in.
3) 36 1 $5\frac{13}{21}$
12 0 $5\frac{55}{63}$, *Ans.*

7) 254 yd. 4 ft. $3\frac{1}{3}$ in.
6) 36 1 $5\frac{13}{21}$
6 0 $2\frac{59}{63}$, *Ans.*

6. 12) 196 Cd. 4 cd. ft. 12 cu. ft.
6) 16 3 1
2 5 $13\frac{1}{2}$, *Ans.*

7. 26 mi.$=$137280 ft.;
137280 ft.$\div$16 ft.$\div$16 ft.$=$8580 rails, *Ans.*

8.
$$\begin{array}{r|lllll} 22.5 & 24 \text{ sq. mi.} & 0 \text{ A.} & 140 \text{ P.} & 0 \text{ sq. yd.} & 0 \text{ sq. ft.} \\ \hline & 1 & 42 & 112 & 26 & 8, \textit{ Ans.} \end{array}$$

9.
$$\begin{array}{rlll} & 202 \text{ yd.} & 1 \text{ ft.} & 6\frac{3}{4} \text{ in.} \\ & & & 5 \\ \hline 3) & 1012 & 1 & 9\frac{3}{4} \\ \hline & 337 & 1 & 7\frac{1}{4}, \textit{ Ans.} \end{array}$$

10. 336 bu. 3 pk. 4 qt.$=$10780 qt.;
4 bu. 3 pk. 2 qt.$=$154 qt.;
10780 qt.$\div$154 qt.$=$70 times, *Ans.*

11. 356 bu. 3 pk. 5 qt.$=$11421 qt.;
1 bu. 1 pk. 7 qt.$=$47 qt.;
11421 qt.$\div$47 qt.$=$243 boxes, *Ans.*

13. 19 T.$=$380 cwt.; (380 cwt.$+$6 cwt.)$\div 41 = 9\frac{17}{41}$ cwt.;
$\frac{17}{41}$ cwt.$=\frac{1700}{41}$ lb.; (1700 lb.$+$22 lb.)$\div 41 = 42$ lb.;
9 cwt. 42 lb., *Ans.*

14. 4 mi.$\times 4 = 16$ sq. mi.; 16 sq. mi.$=$10240 A.;
10240 A.$\div$62 A.$=165\frac{10}{62}$ A.; $\frac{10}{62}$ A.$=\frac{1600}{62}$ P.;
1600 P.$\div 62 = 25\frac{50}{62}$ P.; $\frac{50}{62}$ P.$=\frac{1512\frac{1}{2}}{62}$ sq. yd.;
$\frac{1512\frac{1}{2}}{62}$ sq. yd.$\div 62 = 24.39516+$ sq. yd.;
165 A. 25 P. 24.395 sq. yd., *Ans.*

Art. 448.

2.
$$\begin{array}{lll} 7 \text{ hr.} & 9 \text{ min.} & 19\frac{1}{4} \text{ sec.} \\ & & 15 \\ \hline 107^\circ & 19' & 48\frac{3}{4}'', \textit{ Ans.} \end{array}$$

3.	12 hr.	0 min.	0 sec.
	9	1	37
	2	58	23, dif. time.
			15
	44°	35′	45″, dif. long.
	77	51	
	122	26	45 W., *Ans.*

4.	1 hr.	5 min.	42 sec.
			15
Take	16°	25′	30″, dif. long.
From	87	37	45
	71	12	15 W., Ans.

5. 6 hr. × 15 = 90° W., sunrise; 90° E., sunset; 12 hr. × 15 = 180° E., midnight, *Ans.*

Art. 450.

2.	Ann Arbor,	83°	43′	0″
	Cambridge,	71	7	40
	15)	12	35	20, dif. long.
			50 min.	21⅓ sec., *Ans.*

3.	West Point,	73°	57′ W.	
	Bombay,	72	54, E.	
		146	51, diff. long.	
			4	
	9 hr.	47 min.	24 sec., dif. time.	
	P.M.	3	30	
	A.M.	1	17	24 (next day), *Ans.*

4. Washington, 77° 0′ 15″ W.
Rome, 12 27 E.
15) 89 27 15, dif. long.
5 hr. 57 min. 49 sec., *Ans.*

5. Chicago, 87° 37′ 45″ W.
Paris, 2 20 E.
15) 89 57 45, dif. long.
5 hr. 59 min. 51 sec., *Ans.*

6. N. Orleans, 90° 2′ 30″ W.
N. York, 74 3 W.
15) 15 59 30, dif. long.
1 hr. 3 min. 58 sec., *Ans.*

7. Jefferson City, 92° 8′ 0″ W.
Albany, 73 44 50 W.
15) 18 23 10, dif. long.
1 hr. 13 min. 32⅔ sec., *Ans.*

8. St. Louis, 90° 15′ 15″ W.
Richmond, 77 25 45 W.
15) 12 49 30, dif. long.
51 min. 18 sec., *Ans.*

9. Mexico, 99° 5′ W.
N. York, 74 3 W.
25 2, dif. long.
4
1 hr. 40 min. 8 sec., *Ans.*

10. Ann Arbor, 83° 43′ 0″ W.
Berlin, 13 23 45 E.
15) 97 6 45, dif. long.
6 hr. 28 min. 27 sec, Ans.

11.	San Fran.	122°	26′	45″ W.
	Mexico,	99	5	W.
	15)	23	21	45, dif. long.
		1 hr.	33 min.	27 sec., *Ans.*

12.	Cincinnati,	84°	29′	31″ W.
	Boston,	71	3	30 W.
	15)	13	26	1, dif. long.
	Take		53 min.	$44\frac{1}{15}$ sec., dif. time;
	From	6 hr.		
	A. M.	5 hr.	6 min.	$15\frac{14}{15}$ sec., *Ans.*

Chicago,	87°	37′	45″ W.
Boston,	71	3	30 W.
15)	16	34	15, dif. long.
Take	1 hr.	6 min.	17 sec., dif. time;
From	6		
A. M.	4 hr.	53 min.	43 sec., *Ans.*

St. Louis,	90°	15′	15″ W.
Boston,	71	3	30 W.
15)	19	11	45, dif. long.
Take	1 hr.	16 min.	47 sec., dif. time;
From	6		
A. M.	4 hr.	43 min.	13 sec., *Ans.*

13.	Univ. Va.,	78°	31′	30″ W.
	Berlin,	13	23	45 E.
	15)	91	55	15, dif. long.
		6 hr.	7 min.	41 sec., dif. time;
	P. M.	6		
	A. M.	12 hr.	7 min.	41 sec. (next day), *Ans.*

St. Paul,	95°	4′	55″	W.
Univ. Va.,	78	31	30	W.
15)	16	33	25,	dif. long.
Take	1 hr.	6 min.	$13\frac{2}{3}$ sec.,	dif. time;
From	6			
P. M.	4 hr.	53 min.	$46\frac{1}{3}$ sec.,	*Ans.*

Astoria,	124°	0′	0″	W.
Univ. Va.,	78	31	30	W.
15)	45	28	30,	dif. long.
Take	3 hr.	1 min.	54 sec.,	dif. time.
From	6			
P. M.	2 hr.	58 min.	6 sec.,	*Ans.*

14.	N. York,	74°	3′	W.
	Rome,	12	27	E.
		86	30,	dif. long.
			4	
	5 hr.	46 min.	0 sec.,	later, *Ans.*

	N. York,	74°	3′	W.
	Paris,	2	20	E.
		76	23,	dif. long.
			4	
	5 hr.	5 min.	32 sec.,	later, *Ans.*

15.	San. Fran.,	122°	26′	45″	W.
	Bombay,	72	54		E.
	Take	195	20	45	
	From	360			
	15)	164	39	15	
	Loses	10 hr.	58 min.	37 sec.,	*Ans.*

Art. 465.

1. 27 ft. × 21 = 567 sq. ft.; 567 sq. ft. ÷ 9 = 63 sq. yd.

2. 195 sq. ft. ÷ 26 = $7\frac{1}{2}$ ft. wide, *Ans.*

3. (305 sq. yd. × 9) ÷ 45 = 61 ft. long, *Ans.*

4. $12\frac{1}{3}$ yd. × $12\frac{1}{3}$ = 152 sq. yd. 1 sq. ft., *Ans.*

5. $18\frac{2}{3}$ yd. × $18\frac{2}{3}$ = 348 sq. yd. 4 sq. ft., *Ans.*

6. 18.5 rd. × 20.5 = 379.25 sq. rd., *Ans.*

7. 5.14 ch. × 6.25 = 32 sq. ch. 2 P., *Ans.*

8. 25.5 ft. × 16.75 = 427.125 sq. ft., *Ans.*

9. 14 yd. 1 ft. 10 in. = 526 in.;
526 in. × 526 = 276676 sq. in.;
276676 sq. in. = 7 sq. rd. 1 sq. yd. 6 sq. ft. 88 sq. in.

10. 374.125 sq. ft. ÷ 20.5 = 18.25 ft., width, *Ans.*

11. 52.5625 sq. ch. ÷ 7.25 = 7.25 ch., length, *Ans.*

12. $180\frac{4}{9}$ sq. yd. ÷ $9\frac{2}{3}$ = 18 yd. 2 ft., length, *Ans.*

13. $(\overline{16 \text{ ft.} \times 2} + \overline{12.5 \text{ ft.} \times 2}) \times 9.25 = 58\frac{21}{36}$ sq. yd., *Ans.*

14. (24 ft. × 20) ÷ (12 ft. × $\frac{5}{6}$) = 48 planks, *Ans.*

15. (24 ft. × 16.5) ÷ 9 = 44 yd., *Ans.*

16. (52 ft. × 35) ÷ (3 ft. × $2\frac{1}{3}$) = 260 yd., *Ans.*

17. (28 ft. × 23.75) ÷ (3 ft. × 2.5) = $88\frac{2}{3}$ yd., *Ans.*

18. (27.25 ft. × 22.5) ÷ (3 ft. × 2.5) = $81\frac{3}{4}$ yd., *Ans.*

19. $\$.94 \times (\overline{34 \text{ ft.} \times 18.5} \div \overline{3 \text{ ft.}}\ \overline{\times 2}) = \$98.54\frac{1}{3}$, *Ans.*

20. $\$1.08 \times (\overline{30.25 \text{ ft.} \times 22} \div 9) \times \frac{4}{3} = \$106.48$, *Ans.*

21. $\$2.125 \times (\overline{18.5 \text{ ft.} \times 16.4} \div 9) \times \frac{8}{7} = \$81.87$, *Ans.*

22. $\$1.22 \times (\overline{40 \text{ ft.} \times 36} \div \overline{3 \text{ ft.} \times 4}) = \$146.40$, *Ans.*

23. $\$1.15 \times (26.5 \text{ ft.} \times 18) \div 9 = \$60.95$, *Ans.*

24. $(48 \text{ ft.} \times 10 \times 144) \div (8 \text{ in.} \times 8) = 1080$ tiles, *Ans.*

25. $\$2.70 \times (312 \text{ ft.} \times 6.5) \div 9 = \$608.40$, *Ans.*

26. $\$.45 \times (48.5 \text{ ft.} \times 27) \div 9 = \$65.475$, *Ans.*

27. $(104\frac{3}{4} \text{ ft.} \times 20\frac{1}{3}) \div 100 = 21.29\frac{11}{12}$ squares, *Ans.*

28. $(40 \text{ ft.} + 36.5 \text{ ft.}) \times 2 \times 22.25 = 3404.25$ sq. ft., sides;
$40 \text{ ft.} \times 36.5 \text{ ft.} = 1460$ sq. ft., ceiling;
$\$.36 \times (3404.25 + 1460 - 1375) \div 9 = \$139.57$, *Ans.*

29. $\$.75 \times (8\frac{1}{4} \text{ ft.} \times 5\frac{1}{3}) \times 6 = \$198$, *Ans.*

30. $(24 \text{ ft.} + 16.5 \text{ ft.}) \times 2 \times 18 = 1458$ sq. ft., sides;
$(\overline{2\frac{1}{3} \text{ ft.} \times 5\frac{2}{3}} + \overline{2\frac{3}{4} \text{ ft.} \times 6\frac{1}{2}}) \times 2 = 62\frac{7}{36}$ sq. ft., windows and doors;
$(\overline{24 \text{ ft.} + 16.5 \text{ ft.} \times 2}) - (2.75 \text{ ft.} \times 2) = 75.5$ ft., length of base;
$75\frac{1}{2} \text{ ft.} \times \frac{3}{4} = 56\frac{5}{8}$ sq. ft., area of baseboard;
$1458 \text{ sq. ft.} - (62\frac{7}{36} \text{ sq. ft.} + 56\frac{5}{8} \text{ sq. ft.}) = 1339\frac{1}{4}$ sq. ft.;
$1339\frac{1}{4} \text{ sq. ft.} \div (8 \text{ yd.} \times 3 \times 2\frac{1}{3}) = 16.740625$ rolls;
$\$1.20 \times 16.740625 = \$20.08874$, cost of paper;
$\$.09 \times (24 \text{ ft.} + 16.5 \text{ ft.}) \times 2 = \$7.29$, cost of moulding;
$\$20.08874 + \$7.29 = 27.378+$, *Ans.*

31. $(53\frac{1}{3} \text{ ft.} \times 28) \div (1\frac{1}{3} \text{ ft.} \times 1\frac{1}{3}) = 840$ sods, *Ans.*

32. $24 \text{ yd.} \times \frac{3}{4} \times \overset{2}{\frac{8}{5}} = 28\frac{4}{5}$ yd., *Ans.*

33. $(16 \text{ ft.} + 14 \text{ ft.}) \times 2 \times 10 = 600$ sq. ft., sides;
$(600 \text{ sq. ft.} - 124 \text{ sq. ft.}) \div (8 \text{ yd.} \times 3 \times 1\frac{1}{2}) = 13\frac{2}{9}$ rolls.

34. $(5\frac{2}{3}$ ft. $+ 4$ ft.$) \times 2 \times 5 = 96\frac{2}{3}$ sq. ft., sides;
$5\frac{2}{3}$ ft. $\times 4 = 22\frac{2}{3}$ sq. ft., bottom;
$\$.12 \times 5 \times (96\frac{2}{3} + 22\frac{2}{3}) = \$71.60$, *Ans.*

35. $12\frac{11}{12}$ ft. $\times 4 \times 9\frac{1}{4} = 477\frac{11}{12}$ sq. ft., sides;
$6\frac{1}{6}$ ft. $\times 2\frac{1}{3} \times 3 = 43\frac{1}{6}$ sq. ft., windows and door;
$\$.28 \times (477\frac{11}{12}$ sq. ft. $- 43\frac{1}{6}$ sq. ft.$) \div 9 = \$13.525$, *Ans.*

36. (46 ft. × 40) + 46 sq. ft., extra courses = 1886 sq. ft., area;
1886 sq. ft. × 144 ÷ (4 in. × 6) = 11316 shingles, *Ans.*

37. $\$.30 \times (\overline{21\frac{2}{3}\text{ ft.} + 14\frac{5}{6}}\text{ ft.} \times 2 \times 10.5) \div 9 = \$25.55$, *Ans.*

38. \$15.375 × (64.75 ft. × 45) ÷ 100 = \$447.96, *Ans.*

Art. 467.

1. 120 rd. × 120 ÷ 160 sq. rd. = 90 A., *Ans.*

2. 16 A. × 160 ÷ 80 rd. = 32 rd., width, *Ans.*

3. 6.5 mi. × 5.5 × 640 ÷ 120 A. = $190\frac{2}{3}$ farms, *Ans.*

4. 121 yd. × (75 ft. ÷ 3 ft.) ÷ 4840 sq. yd. = .625 A., *Ans.*

5. $(\overline{435\text{ A.} \times 160} + 96\text{ P.}) \div 264 = 264$ rd., *Ans.*

6. \$42.75 × (189.5 rd. × 150) ÷ 160 = \$7594.80, *Ans.*

7. 70 rd. × 70 = 4900 sq. rd.; 5 A. = 800 sq. rd.;
4900 sq. rd. − 900 sq. rd. = 4000 sq. rd.; $\frac{4000}{4900} = \frac{40}{49}$.

8. 5 A. × 160 ÷ (10 A. × 160 ÷ 50) = 25 rd., length, *Ans.*

9. $(\$2.75 \times \overline{160 + 40 \times 2}) - (\$2.75 \times 80 \times 4) = \$220$ less.

10. \$100 × (16 ch. × 15) ÷ 10 sq. ch. = \$2400, cost;
\$50 × (16 ch. × 15 × 16) ÷ (6 rd. × 5) = \$6400, sale;
\$6400 − \$2400 = \$4000, gain, *Ans.*

Art. 468.

1. 23040 A.÷288=80.; $\frac{80}{640}$ A.=$\frac{1}{8}$ Sec., *Ans.*

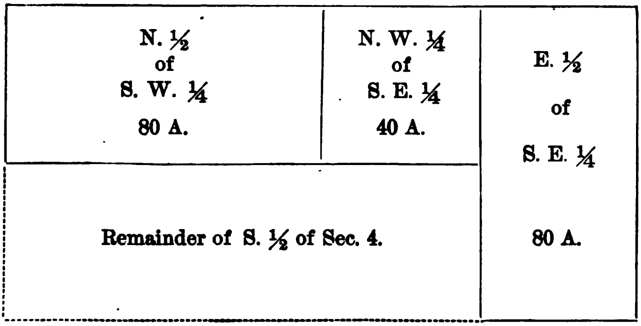
2. $(\overline{\tfrac{1}{2}\text{ mi.}\times 4\times 320}\div 2\text{ rd.})\times 3\times 6=5760$ rails;
\$40×5.76=\$230.40, *Ans.*

3. \$2.25×320=\$720; \$4.375×160=\$700;
\$700−(\$720÷2)=\$340, gain, *Ans.*

4. 160 A.+80 A.=240 A. $\frac{240}{640}$ A.=$\frac{3}{8}$ Sec., *Ans.*

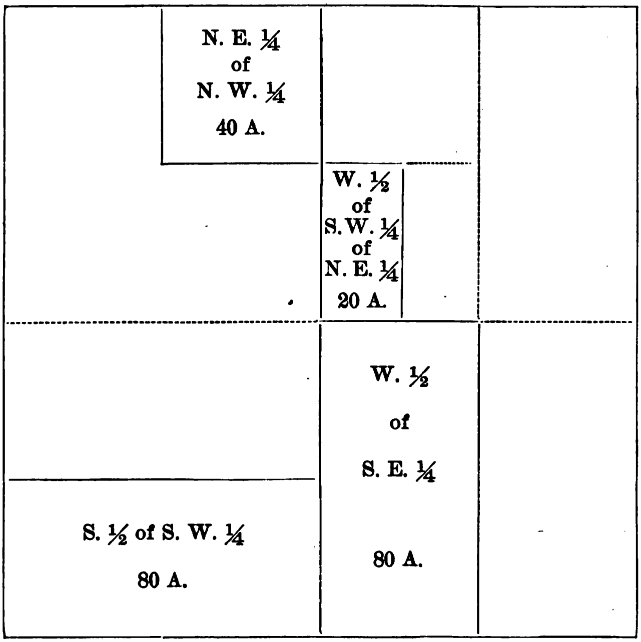
5. \$2×320=\$640, purchase; \$2.75×80=\$220;
\$3.50×40=\$140; \$3.84×80=\$307.20;
320 A.−(80 A.+40 A.+80 A.)=120 A. left;
\$220+\$140+\$307.20−\$640=\$27.20, gain, *Ans.*

HALF-SECTION.



6. $1.25 × 640 = $800, purchase;
$2.50 × 80 = $200; $1.75 × 40 = $70;
$2 × 80 = $160; $3 × 20 = $60;
640 A. − (80 A. + 40 A. + 80 A. + 20 A.) = 420 A. left;
$2.25 × 420 = $945;
$945 + $200 + $70 + $160 + $60 − $800 = $635, gain.

SECTION.



Art. 474.

1. 6 ft. × 4 × 4 = 96 cu. ft., *Ans.*

2. *9 ft.* × 4 × 3 = 108 cu. ft., *Ans.*

3. 1224 cu. ft. ÷ (12 ft. × 12) = 8$\frac{1}{2}$ ft., *Ans.*
4. 8$\frac{1}{2}$ ft. × 6 × 4$\frac{1}{3}$ = 221 cu. ft., *Ans.*
5. (36 ft. × 24 × 6.5) ÷ 27 cu. ft. = 208 cu. yd., *Ans.*
6. 4$\frac{3}{4}$ ft. × 4$\frac{3}{4}$ × 4$\frac{3}{4}$ = 3 cu. yd. 26 cu. ft., 296$\frac{27}{32}$ cu. in.
7. 20$\frac{7}{12}$ ft. × 3$\frac{1}{3}$ × 2$\frac{11}{12}$ = 7 cu. yd. 11 cu. ft. 200 cu. in.
8. 5 ft. × 5 × 6.4 = 5 cu. yd. 25 cu. ft., *Ans.*
9. 6 cu. ft. ÷ (8 ft. × 8) = 1$\frac{1}{8}$ in., *Ans.*
10. 20 cu. ft. ÷ (36 ft. × $\frac{5}{6}$) = 8 in., *Ans.*
11. 13 cu. yd. 14 cu. ft. 9 cu. in. = 365$\frac{25}{48}$ cu. ft.;
365$\frac{25}{48}$ cu. ft. ÷ (7$\frac{1}{4}$ ft. × 5$\frac{1}{2}$) = 9 ft. 2 in., *Ans.*
12. 24$\frac{3}{4}$ ft. × 18$\frac{1}{3}$ × 10$\frac{2}{3}$ = 4840 cu. ft., *Ans.*
13. (30 ft. × 8 × 6$\frac{1}{2}$) ÷ 128 cu. ft. = 12$\frac{3}{16}$ Cd., *Ans.*
14. (67.5 Cd. × 128) ÷ (90 × 12) = 8 ft., *Ans.*
15. $\$3.75 \times (\overline{12.5\text{ ft.} \times 8 \times 4.5} \div 128\text{ cu. ft.}) = \$13.183.$
16. $\$.42 \times (\overline{45\text{ ft.} \times 28 \times 8.5} \div 27\text{ cu. ft.}) = \$166.60,$ *Ans.*
17. 128 cu. ft. ÷ (3 × 5$\frac{1}{3}$) = 8 ft., *Ans.*
18. (36 in. × 20 × 15) ÷ (8 in. × 6 × 3) = 75 cans, *Ans.*
19. $\$3.50 \times (\overline{50\text{ ft.} \times 25 \times 12} \div 128\text{ cu. ft.}) = \$410.156.$
20. (1000 cu. ft. ÷ 200) ÷ ($\frac{5}{6}$ × $\frac{1}{4}$) = 24 ft., *Ans.*

Art. 477.

2. $8\text{ in.} + (\overline{.25 \times 2} \div 2) = 8.25$ in., length;
$2\text{ in.} + (\overline{.25 \times 2} \div 2) = 2.25$ in., thickness;
8.25 in. × 2.25 = 18.5625 sq. in., area;
16.5 in. ÷ 4 = 4.125 in., width;
18.5625 sq. in. × 4.125 = 76.5703125 cu. in. in a brick;
1728 cu. in. ÷ 76.5703125 cu. in. = 22$\frac{206}{363}$ br. in a ft.;
42 ft. × 24 × 1$\frac{3}{8}$ × 22$\frac{206}{363}$ = 31278$\frac{6}{11}$ bricks, Ans.

3. (60 ft. × 16.5 × 1.5) ÷ 24.75 cu. ft. = 60 Pch., *Ans.*

4. (120 ft. × 6.75 × 1.5) ÷ 24.75 cu. ft. = $49\frac{1}{11}$ Pch., *Ans.*

5. $8.5 + (\overline{.25 \times 2} \div 2) = 8.75$ in., length;
$2.25 + (\overline{.25 \times 2} \div 2) = 2.5$ in., thickness;
8.75 in. × 2.5 = 21.875 sq. in., area;
12.375 in. ÷ 3 = 4.125 in., width;
21.875 sq. in. × 4.125 = 90.234375 cu. in. in a brick;
1728 cu. in. ÷ 90.234375 cu. in. = 19.15 br. in a cu. ft.;
$(\overline{36 \text{ ft.} - 1\frac{1}{32} \text{ ft.}} \times 24 \times 1\frac{1}{32} \times 4) - 224$ cu. ft. = 3237.906 cu. ft., in the walls;
3237.906 cu. ft. × 19.15 = 62006 bricks, *Ans.*

6. \$.56 × (240 ft. × 38 × 8.5) ÷ 27 cu. ft. = \$1607.82, *Ans.*

7. $(\overline{41\frac{1}{4} \times 2} + \overline{33 \times 2}) \times 8 \times 1\frac{1}{2} = 1782$ cu. ft.;
1782 ÷ 29.75 = 72 perches;
(41.25 × 33 × 8) ÷ 27 = 403 loads; \$.50 × 403 = $\$201\frac{2}{3}$;
$\$3.75 \times 72 + \$201\frac{2}{3} = \$471.66\frac{2}{3}$, *Ans.*

8. $(\overline{16 \times 2} + \overline{12 \times 2}) \times 16\frac{1}{2} = 924$ ft.;
Allow 12 ft. for corners, 924 − 12 = 912 ft. +;
912 × 6 × 3 = 16416 cu. ft.;
16416 cu. ft. ÷ $24\frac{3}{4} = 663\frac{3}{11}$ perches, *Ans.*

9. \$.42 × (650 ft. × 72 × 4.5) ÷ 27 cu. ft. = \$3276, *Ans.*

10. $8.25 + (\overline{.25 \times 2} \div 2) = 8.5$ in., length;
$2.375 + (\overline{.25 \times 2} \div 2) = 2.625$ in., thickness;
8.5 in. × 2.625 = 22.3125 sq. in., area;
17 in. ÷ 4 = 4.25 in., width;
22.3125 sq. in. × 4.25 = 94.828125 cu. in. in a brick;
1728 cu. in. ÷ 94.828125 cu. in. = 18.222 + br. in a ft.;
60 ft. × $21\frac{7}{8} \times 1\frac{5}{12} = 1859.375$ cu. ft., in the wall;
1859.375 cu. ft. × 18.222 = 33881.53125 bricks;
\$12.50 × 33.88153125 = \$423.52, *Ans.*

11. $37.5 \text{ ft.} \times 9 \times 2 \times 2 = 1350$ cu. ft., sides;
$(26 \text{ ft.} - 2 \text{ ft.}) \times 9 \times 2 \times 2 = 864$ cu. ft., ends;
$1350 \text{ cu. ft.} + 864 \text{ cu. ft.} = 2214$ cu. ft., masonry;
$\$3.85 \times 2214 \text{ cu. ft.} \div 24.75 \text{ cu. ft.} = \$344.40$ cost, *Ans.*

Art. 481.

3. $(16 \text{ ft.} \times 10 \times 4) \div 12 = 53\frac{1}{3}$ sq. ft., *Ans.*

4. $(17 \text{ ft.} \times 11 \times 3 \times 2) \div 12 = 93\frac{1}{2}$ sq. ft., *Ans.*

6. $\$.06 \times (12 \text{ ft.} \times \overline{17 \text{ in.} + 11 \text{ in.} \div 2} \times 5) \div 12 = \$4.20.$

7. $(15 \text{ ft.} \times 16 \times 3.5 \times 10) \div 12 = 700$ ft.;
$\$2.25 \times 7 = \$15.75$, *Ans.*

9. $(15 \text{ ft.} \times 20 \div 12) - 15 \text{ ft.} = 10$ ft.;
$(144 \text{ sq. in.} \times 10 \div 20) \div 12 = 6$ ft., *Ans.*

11. $5 \text{ ft. } 3 \text{ in.} = 63$ in.; $(144 \text{ sq. in.} \times 7) \div 63 = 16$ in., *Ans.*

12. $(26 \text{ ft.} \times 6 \times 9 \times 3) \div 12 = 127$ board ft.;
$\$1.75 \times 127 \div 100 = \$6.1425$, *Ans.*

13. $(14 \text{ ft.} \times 3 \times 4 \times 8) \div 12 = 112$ board ft.;
$\$9.50 \times 112 \div 1000 = \$1.064$, *Ans.*

15. $(\overline{1728 \text{ cu. in.} \times 15} \div \overline{10 \times 16}) \div 12 = 13\frac{1}{2}$ ft., *Ans.*

16. $(4 \text{ ft.} \times \overline{2 \text{ ft. } 6 \text{ in.} - 2 \text{ in.}} \times 2) \div 12 = 18\frac{2}{3}$ sq. ft., sides;
$(\overline{3 \text{ ft. } 6 \text{ in.} - 2 \text{ in.}} \times 28 \times 2) \div 12 = 15\frac{5}{9}$ sq. ft., ends;
$(4 \text{ ft.} \times 42 \times 2) \div 12 = 28$ sq. ft., covers;
$18\frac{2}{3} \text{ sq. ft.} + 15\frac{5}{9} \text{ sq. ft.} + 28 \text{ sq. ft.} = 62\frac{2}{9}$ sq. ft., *Ans.*

17. $(12 \text{ ft.} \times 11 \times 36) \div 12 = 396$ board ft.;
$\$2.50 \times 396 \div 100 = \$9.90$, *Ans.*

18. $(14.5 \text{ ft.} \times 10 \times 3 \times 16) \div 12 = 580$ board ft.;
$\$16.25 \times .58 = \$9.425$, *Ans.*

19. $(36 \text{ ft.} \times 10 \times \overline{12 \text{ in.} + 9 \text{ in.} \div 2}) \div 12 = 315$ board ft.;
315 board ft. $\div 12 = 26\frac{1}{4}$ cu. ft., *Ans.*

20. $(16 \text{ ft.} \times 10 \times 124) \div 12 = 1653\frac{1}{3}$ board ft.;
$(14 \text{ ft.} \times 16 \times 120) \div 12 = 2240$ board ft.;
$(15 \text{ ft.} \times 12 \times 2.5 \times 40) \div 12 = 1500$ board ft.;
$(18 \text{ ft.} \times 10 \times 3 \times 96) \div 12 = 4320$ board ft.;
$(12 \text{ ft.} \times 4 \times 3 \times 60) \div 12 = 720$ board ft.;
$\$15 \times 1.653\frac{1}{3} = \$24.80$; $\$16.50 \times 2.24 = \$36.96$;
$\$18.75 \times 1.5 = \$28.125$; $\$14 \times 4.32 = \$60.48$;
$\$12.50 \times .72 = \$9$;
$\$24.80 + \$36.96 + \$28.125 + \$60.48 + \$9 = \$159.365$.

21. $\$30 \times (48 \times 25 \times 1\frac{1}{4} \times 2) \div 1000 = \$90$, *Ans.*

22. $(\overline{16 \text{ ch.} + 8 \text{ ch.}} \times 4 \times 16\frac{1}{2} \times 2) \div 8 \text{ ft.} = 396$ posts;
$(\overline{16 \text{ ch.} + 8 \text{ ch.}} \times 4 \times 16\frac{1}{2} \times 2) \div 16 \text{ ft.} = 198$ panels;
$16 \text{ ft.} \times (12 + 6 + \overline{9 + 3}) \div 12 = 60$ sq. ft. in a panel;
60 sq. ft. $\times 198 = 11880$ sq. ft., lumber;
$(\$25 \times 3.96) + (\$14.80 \times 11.88) = \$274.824$, cost, *Ans.*

Art. 485.

1. $(6 \text{ ft.} \times 5 \times 4 \times 1728) \div 2150.42 = 96.423$ bu., *Ans.*

2. 123 bu. $\times 2150.42 \div 1728 = 159.29+$ cu. ft., *Ans.*

3. $(8 \text{ ft.} \times 6\frac{1}{2} \times 3\frac{1}{3} \times 1728) \div 2150.42 = 139.2$ bu., *Ans.*

5. $(324 \text{ bu.} + 81 \text{ bu.}) \div (6 \times 4.5) = 15$ ft., *Ans.*

6. $(900 \text{ bu.} + 225 \text{ bu.}) \div (12 \times 10) = 9\frac{3}{8}$ ft., *Ans.*

7. $(100.8 \text{ bu.} + 25.2 \text{ bu.}) \div (7 \times 6) = 3$ ft., *Ans.*

8. $(8.5 \text{ ft.} \times 4.25 \times 3.75) - \frac{1}{5} = 108.375$ bu., *Ans.*

9. $(10 \text{ ft.} \times 6 \times 4) - \frac{1}{5} = 192$ bu., oats, *Ans.*
192 bu. $- \frac{1}{5} = 153\frac{3}{5}$ bu., potatoes, *Ans.*

10. $(12 \text{ ft.} \times 3 \times 2.5) - \frac{1}{5} = 72$ bu., barley, *Ans.*
$72 \text{ bu.} - \frac{1}{5} = 57\frac{3}{5}$ bu., apples, *Ans.*

11. $\$2 \times (\overline{20 \text{ ft.} \times 12 \times 5} - \frac{1}{5}) = \$1920$, *Ans.*

12. $\$1.375 \times (7 \text{ ft.} \times 6 \times 5 - \frac{1}{5}) \times \frac{3}{4} = \$173.25$, *Ans.*

13. $\$1.78 \times (\overline{10 \text{ ft.} \times 6 \times 5} - \frac{1}{5}) \div .48 = \$205.056$, *Ans.*

14. $(\overline{15 \text{ ft.} \times 7\frac{1}{3} \times 8} - \frac{1}{5}) - \frac{1}{5} = 563\frac{1}{5}$ bu. of ears ;
$\$.92 \times 563\frac{1}{5} \div 2 = \$259.072$, *Ans.*

15. $(10 \text{ ft.} \times 5 \times 4) - \frac{1}{5} = 160$ bu. ;
$48 \text{ lb.} \times 160 \div 196 \text{ lb.} = 39\frac{9}{49}$ bbl., *Ans.*

16. $(40 \text{ ft.} \times 30 \times 20 \times 58\frac{1}{8}) \div 2000 = 697\frac{1}{2}$ tons, *Ans.*

17. $\$1.50 \times 12400 = \$18600$, cost ;
$(12400 \text{ bu.} \div 8 \text{ bu.}) \times 6 = 9300\text{s.}$, freight
$(12400 \text{ bu.} \times 60 \div 100) \times 12 = 89280\text{s.}$;
$(\overline{89280\text{s.} - 9300\text{s.}} \div 20\text{s.}) \times 4.8665 = \$19461.1335$;
$\$19461.1335 - \$18600 = \$861.13$ gain, *Ans.*

18. $(17 \text{ ft.} \times 6 \times 3) \div 36 \text{ cu. ft.} = 8\frac{1}{2}$ tons, *Ans.*

19. $\$6.75 \times (6 \text{ ft.} \times 4 \times 5.75) \div 34.5 \text{ cu. ft.} = \$27$, *Ans.*

20. $(10 \text{ yd.} \times 6 \times 6 \times 27) \div 36 \text{ cu. ft.} = 270$ tons ;
$\$5.50 \times 270 = \$1485$, *Ans.*

21. $\$5.90 \times (\overline{7 \text{ ft.} \times 5 \times 5} \div 2) \div 35 \text{ cu. ft.} = \$14.75$, *Ans.*

Art. 490.

2. $(4 \text{ ft.} \times 3 \times 1\frac{2}{3} \times 1728) \div 231 \text{ cu. in.} = 149\frac{47}{77}$ gal., *Ans.*

3. $(43659 \text{ cu. in.} \div 231 \text{ cu. in.}) \div 31\frac{1}{2} \text{ gal.} = 6$ bbl., *Ans.*

4. $(48 \text{ hhd.} \times 63 \times 231) \div 1728 \text{ cu. in.} = 404\frac{1}{4}$ cu. ft.

5. $\overline{(11\text{ ft.} \times 6 \times 7 \times 1728} \div 231$ cu. in.) ÷ 63 gal. = $54\frac{6}{7}$ hhd., *Ans.*

6. 6 ft. × 3 × 1.75 × 62.5 = 1968.75 pounds, *Ans.*

7. (22.5 ft. × 3.25 × 6.4 × 1728) ÷ 231 cu. in. = $3500\frac{68}{77}$ gal., *Ans.*

8. (32 hhd. × 63 × 231) ÷ (6 ft. × 8 × 144) = 5 ft. $7\frac{3}{8}$ in.

9. (189.5 gal. × 268.8) — (189.5 gal. × 231) = 7163.1 cu. in., *Ans.*

10. 1728 cu. in. ÷ 231 cu. in. = 7.4805 + gal., *Ans.*

11. (6.5 ft. × 4 × 3.5 × 1728) ÷ 231 cu. in. = $680\frac{8}{11}$ gal.;
$8\frac{1}{3}$ lb. × $680\frac{8}{11}$ = $5672\frac{8}{11}$ pounds, *Ans.*

12. (67.2 cu. in. × 64) — (57.75 cu. in. × 64) = 604.8 cu. in.

13. 10 bu. × 2150.42 = 21504.2 cu. in.;
($.25 × 21504.2 cu. in. ÷ 57.75 cu. in.) — ($5 × 10) = $43.09, *Ans.*

14. (5 ft. × 4 × 3 × 1728) ÷ 231 cu. in. = $448\frac{64}{77}$ gal.;
1 hr. 30 min. = 90 min.; $448\frac{64}{77} \div 90 = 4\frac{76}{77}$ gal., *Ans.*

15. (5000 gal. × 4 × $57\frac{3}{4}$) ÷ ($67\frac{1}{5}$ cu. in. × 8 × 4) = $537\frac{7}{64}$ bu., *Ans.*

16. (7 ft. × 12 × 9 ÷ 2) × $62\frac{1}{2}$ = 23625 pounds, *Ans.*

17. (40 ft. × 20 × 8 × 1728 ÷ 2) ÷ 231 cu. in. = 23937.66 + gal.; $.06 × (23937.66 gal. ÷ 63) = $22.797, *Ans.*

18. $24\frac{2}{3}$ ft. × $12\frac{3}{4}$ = $314\frac{1}{2}$ cu. ft.;
314.5 cu. ft. × 1728 ÷ 231 cu. in. = $2352\frac{48}{77}$ gal., *Ans.*

19. ($7\frac{1}{4}$ ft. × $3\frac{2}{3}$ × $2\frac{5}{6}$ × 1728) ÷ 277.274 cu. in. = 469.39 *gal., Ans.*

Art. 493.

3. 9 lb. 10 oz.=154 oz.; 154 oz. × 437.5=67375 gr.;
67375 gr. ÷ 480 gr.=11 lb. 8 oz. 7 pwt. 7 gr., *Ans.*

4. 16 lb. 8 oz. 10 pwt. 12 gr.=200.525 oz.;
200.525 oz. × 480=96252 gr.;
96252 gr. ÷ 437.5 gr.=13 lb. $12\frac{4}{875}$ oz., *Ans.*

5. 2 lb. 14 oz.=46 oz.; 46 oz. × 437.5=20125 gr.;
20125 gr. ÷ 480 gr.=$41\frac{89}{96}$ oz.;
\$1.80 × $41\frac{89}{96}$=\$$75.46\frac{7}{8}$, *Ans.*

6. 6 lb.=96 oz.; 96 oz. × 437.5 ÷ 480 gr.=$87\frac{1}{2}$ oz., *Ans.*

7. 8 lb.=128 oz.; 128 oz. × 437.5 ÷ 480 gr.=$116\frac{2}{3}$ oz.;
(\$16.25 × $116\frac{2}{3}$ ÷ 12 oz.)—(\$12.50 × 8)=\$57.986.

8. $42\frac{3}{8}$ lb.=678 oz.; 678 oz. × 437.5=296625 gr.;
42.375 lb.=508.5 oz.; 508.5 oz. × 480=244080 gr.;
296625 gr.—244080 gr.=52545 gr., *Ans.*

SECOND PART.

Art. 512.

2. 695 lb. × .35=243.25 lb., *Ans.*

3. \$8428 × .75=\$6321, *Ans.*

4. £2105 × .125=£263.125, *Ans.*

5. 8736 bu. × $.33\frac{1}{3}$=2912 bu., *Ans.*

6. \$35000 × .005=\$175, *Ans.*

7. \$171.24 × 1.20=\$205.488, *Ans.*

8. 312.8 rd. × .045=14.076 rd., *Ans.*

9. \$5728 × 1.05 = \$6014.40, *Ans.*

10. \$3140.75 × 1.0125 = \$3180 +, *Ans.*

11. $2\frac{2}{3}$ mi. × 1.075 = 2 mi. 277 ft. $5\frac{1}{2}$ in., *Ans.*

12. 400 ft. × $.96\frac{2}{3}$ = $386\frac{2}{3}$ ft., *Ans.*

13. $25\frac{5}{7}$ bu. × .84 = 21.6 bu., *Ans.*

14. $\frac{7}{8}$ ton × .25 = $437\frac{1}{2}$ lb., *Ans.*

15. 16400 men × .0075 = 123 men, *Ans.*

16. $\frac{5}{6}$ yr. × $.00\frac{2}{3}$ = $.005\frac{5}{9}$ yr., or $\frac{1}{180}$ yr., *Ans.*

17. $\frac{16}{25}$ hhd. × .00625 = .004 hhd., *Ans.*

18. 196 lb. × 1.35 = 264.6 lb., *Ans.*

19. \$4500 × (.80 + .75 + .625) = \$9896.25, *Ans.*

20. \$1600 × ($.18 + .08\frac{1}{3} + .16$) = \$677.33 = expenses;
\$1600 − \$677.33 = \$922.67 = am't saved.

21. .8 mill × .65 = .52 of mill = part still owned.
\$24640 ÷ .35 × .65 = \$45760, value of part still owned.

22. \$5420 × ($1 - \overline{.15 + .17} + .04$) = \$3902.40, *Ans.*

Art. 515.

2. 75 ÷ 300 = .25 = 25%, *Ans.*

3. 16.5 ÷ 66 = .25 = 25%, *Ans.*

4. \$21.60 ÷ \$20 = 1.08 = 108%, *Ans.*

5. \$.90 ÷ \$18 = .05 = 5%, *Ans.*

6. 80 lb. ÷ 560 lb. ÷ $.14\frac{2}{7}$ = $14\frac{2}{7}$%, *Ans.*

7. 49 mi. ÷ 980 mi. = .05 = 5%, *Ans.*

8. \$26.40 ÷ \$480 = .055 = $5\frac{1}{2}$%, *Ans.*

9. *120* A. ÷ *192* A. = .625 = $62\frac{1}{2}$%, *Ans.*

10. 10.99 mi. ÷ 15 mi. = .7326 = 73$\frac{4}{15}$%, *Ans.*

11. 5 gal. 3 qt. ÷ 46 gal. = 5.75 gal. ÷ 46 gal. = .125 = 12$\frac{1}{2}$%, *Ans.*

12. \$.30 ÷ \$4 = .075 = 7$\frac{1}{2}$%, *Ans.*

13. 4 bu. 2 pk. 6 qt. ÷ 6 bu. 1 pk. = 4.6875 bu. ÷ 6.25 bu. = .75 = 75%, *Ans.*

14. 448 da. ÷ 5600 da. = .08 = 8%, *Ans.*

15. 5 lb. 10 oz. ÷ 15 lb. = 5.625 lb. ÷ 15 lb. = .375 = 37$\frac{1}{2}$%.

16. 13.5 ÷ 225 = .06 = 6%, *Ans.*

17. $\frac{21}{35} \div \frac{56}{105} = 1\frac{1}{8} = 112\frac{1}{2}\%$, *Ans.*

18. 3$\frac{5}{8}$ ÷ 18$\frac{1}{8}$ = .2 = 20%, *Ans.*

19. 22$\frac{4}{5}$ ÷ 182.4 = .125 = 12$\frac{1}{2}$%, *Ans.*

20. $100\% - (25\% + \overline{\tfrac{1}{3} \text{ of } 75\%}) = 50\%$, *Ans.*

21. \$9828 ÷ \$15120 = .65 = 65%, *Ans.*

Art. 518.

2. \$54 ÷ .15 = \$360, *Ans.*

3. \$18.75 ÷ .025 = \$750, *Ans.*

4. 4.56 A. ÷ .05 = 91.2 A., *Ans.*

5. 39.6 lb. ÷ .075 = 528 lb., *Ans.*

6. 828 ÷ 1.20 = 690, *Ans.*

7. 6119 ÷ 1.055 = 5800, *Ans.*

8. .43 ÷ .71$\frac{2}{3}$ = .6, *Ans.*

9. 31$\frac{1}{4}$ ÷ .31$\frac{1}{4}$ = 100, *Ans.*

10. \$281.25 ÷ .375 = \$750, *Ans.*

11. $\$4578 \div .84 = \$5450$, *Ans.*

12. $37\frac{1}{2}$ bu. $\div .0625 = 600$ bu., *Ans.*

13. 1260 bbl. $\div .125 = 10080$ bbl., *Ans.*

14. 800 bu. $\times .25 \div .025 = 8000$ bu., *Ans.*

15. 3150 bu. $\div \overline{100\% - 30\%} = 4500$ bu., *Ans.*

16. $\$250 \div \overline{25\% \times 33\frac{1}{3}\%} = \$3000$, *Ans.*

17. $\$5860 \div \overline{45\% \times 16\frac{2}{3}\%} = \$78133\frac{1}{3}$, *Ans.*

18. $\$295.12 \div .13\frac{1}{3} = \$2213.40$, A's money.
$\$2213.40 \times .04\frac{2}{3} \div .08 = \$1291.125$, B's money.
$\$2213.40 - \$1291.15 = \$922.25$, *Ans.*

Art. 520.

2. $2950 \div 1.18 = 2500$, *Ans.*

3. $\$6900 \div 1.15 = \$6000$, *Ans.*

4. $2640 \div .88 = 3000$, *Ans.*

5. $\$1000 \div .80 = \$1250$, *Ans.*

6. $\$4810 \div .65 = \$7400$, *Ans.*

7. $3800 \div 1.12 = 3392.86$, *Ans.*

8. $39600 \div 1.10 = 36000$, *Ans.*

9. $\$2616.25 \div 1.15 = \$2275$, *Ans.*

10. 1098 bu. $\div 1.22 = 900$ bu., *Ans.*

11. $740 \div .925 = 800$, *Ans.*

12. 312 A. $\div .96 = 325$ A., *Ans.*

13. $\$2281.60 \div .92 = \$2480$, *Ans.*

14. $\$234.625 \div .625 = \$375.40$, *Ans.*

15. $\$4563.20 \div .92 \div 160 = \$31$, *Ans.*

16. $\$2008.80 \div .93 \div 48 = \$45$, *Ans.*

17. $\$4910.976 \div \overline{1.10 \times 1.015} = \$4398.55$, *Ans.*

18. $\$3500 \div \overline{100\% - 60\%} = \$8750$, *Ans.*

19. $\$6970 \div \overline{1 + 1.05} = \$3400 =$ first year's profits.
$\$3400 \times 1.05 = \$3570 =$ second year's profits.

20. $(\overline{\$2500 \div 1.20} + \overline{\$2500 \div .80}) - \$5000 = \$208.33\frac{1}{3}$.

Art. 530.

2. $\$1745 \times .20 = \$349$, *Ans.*

3. $\$3120 \times .27 = \$842.40$, *Ans.*

4. $\$2545.50 \times .25 = \$636.375$, *Ans.*

5. $\$2560.75 \times .08 = \$204.86$, *Ans.*

6. $\$58 \times 25 \times .175 = \$253.75$, *Ans.*

7. $\$6840 \times .265 - \$375 = \$1437.60$, *Ans.*

8. $\$1.84 \times 1000 \times .16\frac{2}{3} = \$306.67$, *Ans.*

9. $\$5.125 \times 128 \times .22 = \$144.32$, *Ans.*

10. $\$7.65 \times 3840 \times .375 = \$11016$, *Ans.*

11. $\$450 \div .75 \times 1.25 - \$450 = \$300$, *Ans.*

Art. 531.

3. $\$187.50 \times 1.11 = \$208.125$, *Ans.*

4. $\$12.50 \times .905 = \$11.3125$, *Ans.*

5. $\$.14 \times 1.214 = \$.16996$, *Ans.*

6. $\$5.25 \times 1.185 + \$6.22125$, *Ans.*

7. $\$3.50 \times 1.25 = \$4.375$; $\$3.50 \times .80 = \$2.80$, *Ans.*

8. $\$.625 \times .85 = \$.53125$; $\$1.25 \times .85 = \$1.0625$, *Ans.*

9. $\overline{\$86.04 + \$4.78} \times 1.20 \div 956 = \$.114$, *Ans.*

Art. 532.

3. $\$.095 - \$.08 \div \$.08 = 18\frac{3}{4}\%$, *Ans.*

4. $\$1 - \$.875 \div \$1 = 12\frac{1}{2}\%$, *Ans.*

5. $\$330 - \$275 \div \$275 = 20\%$, *Ans.*

6. $\$1.60 - \$1.25 \div \$1.25 = 28\%$, *Ans.*

7. $\$72.96 - \$9.12 = \$63.84$; $\$9.12 \div \$63.84 = 14\frac{2}{7}\%$, *Ans.*

8. $\$425.98 + 134.52 = \$560.50$;
$\$134.52 \div \$560.50 = 24\%$, *Ans.*

9. $\overline{\$.25 \times 20} - \$3 \div \$3 = 66\frac{2}{3}\%$, *Ans.*

10. $\$114.885 \div \overline{\$4.625 \times 108} = 23\%$, *Ans.*

11. $\frac{3}{4} - \frac{1}{2} \div \frac{1}{2} = 50\%$, *Ans.*

12. $\frac{4}{5} - \frac{1}{2} \div \frac{4}{5} = 37\frac{1}{2}\%$, *Ans.*

13. $1 - \frac{5}{8} \div \frac{5}{8} = 60\%$, *Ans.*

Art. 533.

3. $\$1500 \div .16 = \$9375$, *Ans.*

4. $\$.88 \div .10 = \$8.80$, *Ans.*

5. $\$.06 \div .04 = \$1.50$, *Ans.*

6. $\$4.95 \div .35 = \$14.14+$, *Ans.*

7. $\$2500 \div .15 = \$16666.66\frac{2}{3}$, *Ans.*

8. $\$2000 \div .125 = \$16000$, A's capital;
$\$500 \div .05 = \$10000$, B's capital, *Ans.*

Art. 534.

2. $6÷.875=$6.86, *Ans.*

3. $.96÷1.28=$.75, *Ans.*

4. $5.40÷1.10=$4.91, *Ans.*

5. $.16÷.80=$.20. *Ans.*

6. $207.48÷.85=$244.094, *Ans.*

7. $125÷.75×1.10=$183.33⅓, *Ans.*

8. $550÷.83⅓÷1.12½=$586.64, *Ans.*

9. $\$16000 \div \overline{1 \times 1.25 \times 1.25 \times 1.25 \times 1.25} = \$6553.60.$

Art. 535.

2. $1.12×1.25÷.95=$1.47, *Ans.*

3. $120×1.20÷.96=$150, *Ans.*

4. $.80÷.75=$1.06⅔, *Ans.*

5. $60×1.20÷.75=$96, *Ans.*

Art. 547.

2. $13750×.0275=$378.125, *Ans.*

3. $9384×.00875=$82.11, *Ans.*

4. $.0175×21680=$379.40, *Ans.*

5. $.14625×520×250×.015=$285.19, *Ans.*

6. $92.25×175×.00125=$20.18, *Ans.*

7. $9346.80×.0625=$584.175, *Ans.*

8. $(\overline{\$3.25 \times 225} + \overline{\$4.50 \times 316}) \times .045 = \$96.90$, *Ans.*

Art. 548.

2. $165÷$4950=$3\frac{1}{3}\%$, *Ans.*

3. $63÷$1260=5%, *Ans.*

4. $117.75÷$7850=$1\frac{1}{2}\%$, *Ans.*

5. $\$235.40 \div \overline{\$.32 \times 26750} = 2\frac{3}{4}\%$, *Ans.*

6. $125÷$2500=5%, *Ans.*

7. $\$74.25 \div \overline{\$.045 \times 26400} = 6\frac{1}{4}\%$, *Ans.*

Art. 549.

2. $92.80÷.03=$2784, *Ans.*

3. $210÷.06=$3500, *Ans.*

4. $24÷.0025=$9600, *Ans.*

5. $135÷.015=$9000, *Ans.*

6. $72.03÷.075=$960.40, *Ans.*

Art. 550.

2. $3281.25÷.875=$3750, *Ans.*

3. $560÷.96=$583.33$\frac{1}{3}$, *Ans.*

4. ($23654.25+$132)÷.9375=$25372, *Ans.*

Art. 551.

2. $4908÷1.045=$4696.65, *Ans.*

3. $3246.20÷1.02=$3182.55, *Ans.*

4. $1511.25÷1.0075=$1500, *Ans.*

5. $10701.24÷1.005=$10648, *Ans.*

6. $6720.80÷1.05=$6400.76+, am't invested.
$6720.80−$6400.76=$320.04, commission, *Ans.*

7. $2523.40 ÷ 1.0175 ÷ $.08 = 31000 lb., *Ans.*

8. $10650 ÷ 1.0025 = $10623.44, *Ans.*

9. $45337.50 ÷ 1.025 = $44231.71, am't invested;
$45337.50 — $44231.70 = $1105.79, com., *Ans.*

10. $250.92 ÷ 1.02 ÷ $.15 = 1640 yd., *Ans.*

Art. 553.

1. 40 bu. 3$\frac{1}{5}$ pk. ÷ .85 = 48 bu., *Ans.*

2. $3485 ÷ $\overline{1 + 1.05}$ = $1700, first year's profits;
$1700 × 1.05 = $1785, second year's profits, *Ans.*

3. B's = 100%; A's = 132% of B's;
B has $\frac{32}{132}$ less than A = 24$\frac{8}{33}$%, *Ans.*

4. $1.40 — $1.25 × 450 = $67.50, gain;
$15 ÷ $1.25 = .12 = 12%, gain, *Ans.*

5. $1.125 × 728 ÷ $\overline{.30 \times .50}$ ÷ $\frac{3}{5}$ × $\frac{2}{5}$ = $3640, *Ans.*

6. $47649 ÷ 1.16$\frac{2}{3}$ = $40842 = cost;
$47649 — $40842 = $6807, gain, *Ans.*

7. $37.50 ÷ .00125 = $30000, *Ans.*

8. $\frac{5}{8}$ — $\frac{4}{9}$ ÷ $\frac{4}{9}$ = $\frac{13}{32}$ = 40$\frac{5}{8}$%, *Ans.*

9. $25000 × (.0025 + .01625) = $468.75, *Ans.*

10. 1 — (1 × 1.50 × .50) ÷ 1 = .25 = 25% loss, *Ans.*

11. $21000 — $\overline{\$14700 \div .88}$ ÷ $\overline{\$14700 \div .88}$ = .25$\frac{5}{7}$ = 25$\frac{5}{7}$%, *Ans.*

12. 1 ÷ .80 × .84 — 1 ÷ 1 = .05 = 5%, *Ans.*

13. $5250 × .9425 = $4948.125, *Ans.*

14. $\left(\frac{\$13680}{4}\times 1.15\right)+\left(\frac{\$13680}{3}\times 1.1875\right)+\left(\frac{\$13680}{6}\times 1.20\right)+\left(\frac{\$13680}{4}\times 1.33\frac{1}{3}\right)-\$13680=\$2964,$ gain; $\$2964\div\$13680=.21\frac{2}{3}=21\frac{2}{3}\%$, gain, *Ans.*

Marking Price.

$$\begin{array}{rlrl}
\textit{15.}\ \$\ .12\times 1.25=\$\ .15 & ; & \$\ .15\times 450= & \$\ 67.50\\
3.25\times 1.25=\$4.0625 & ; & 4.0625\times 65= & 264.06\\
.20\times 1.25=\$\ .25 & ; & .25\times 244= & 61.\\
7.36\times 1.25=\$9.20 & ; & 9.20\times 25= & 230.\\
.70\times 1.25=\$\ .875 & ; & .875\times 144= & 126.\\
1.00\times 1.25=\$1.25 & ; & 1.25\times 50= & \underline{62.50}\\
 & & \text{Total at marked price}= & \$811.06
\end{array}$$

$\$811.06\times .90=\$729.96$, am't received, *Ans.*

$$\begin{array}{rr}
\textit{16.}\ \$\ .12\times 1.15\times .945\times 450= & \$\ 58.68\\
3.25\times 1.15\times .945\times 65= & 229.57\\
.20\times 1.15\times .945\times 244= & 53.03\\
7.36\times 1.15\times .945\times 25= & 199.96\\
.70\times 1.15\times .945\times 144= & 109.54\\
1.00\times 1.15\times .945\times 50= & \underline{54.34}\\
 & \$705.12,\ \textit{Ans.}
\end{array}$$

17. $\$9.40\times 18.75\times .975-\$16.75=\$155.09$, *Ans.*

18. $\$7125\div 1.025\div\$.11\frac{1}{4}=61788.6$ lb., *Ans.*

19. $\$.75\div .1875\times\overline{.31\frac{1}{4}-18\frac{3}{4}}=\$.50$, *Ans.*

20. $\$6.80\times 1000=\$6800$; $\$1.20\times 3000=\$3600$.
$(\$6800\times .015)+(\$.01\times 3000)=\$132$, Com.;
$\$.05-1000=\$50$, Storage;
$\$6800+\$3600+\$132+\$50=\$10582$, am't to bal. *books.*

21. $.125 × 28000 − ($3252.89 + $45.86) ÷ $3500 = .0575 = 5¾%, *Ans.*

22. $ .11¼ × 312 = $35.10 $ .12½ × 312 = $39.
.14 × 96 = 13.44 .14⅛ × 96 = 13.56
1.12½ × 84 = 94.50 1.10 × 84 = 92.40
.10¾ × 60 = 6.45 .13 × 60 = 7.80
.24¼ × 110 = 26.675 .22½ × 110 = 24.75
.08⅜ × 184 = 15.41 .07½ × 184 = 13.80
Cost = $191.575 Am't of sales = $191.31

$191.31 × .955 = $182.70, net proceeds.
$191.575 − $182.70 = $8.875, loss, *Ans.*
$8.875 ÷ $191.575 = .046 + = 4⅝ + %, loss, *Ans.*

23. $3.81 × 2400 − ($4.8665 × .5 × 2400 + $255) = $3049.20, gain, *Ans.*
$3049.20 ÷ $6064.80 = .50 = 50% +, gain, *Ans.*

Art. 567.

2. $450 × .06 × 3.75 = $101.25, Int.;
$450 + $101.25 = $551.25, Am't.
$450 × .07 × ⅔ = $21, Int.; $450 + $21 = $471, A'mt.

3. $247 × .055 × 5.25 = $71.32, Int.;
$247 + $71.32 = $318.32, A'mt.
$247 × .08 × ⅚ = $16.47, Int.;
$247 + $16.47 = $263.47, A'mt, *Ans.*

4. $500 × .10 × 4⅙ = $208.33, Int.;
$500 + $208.33 = $708.33, A'mt.
$500 × .05 × $\frac{11}{12}$ = $22.92, Int.;
$500 + $22.92 = $522.92, Am't, *Ans.*

5. $\$36.40 \times .06 \times 1\frac{7}{12} = \$3.46$, at 6%;
$\$36.40 \times .07 \times 1\frac{7}{12} = \$4.03$, at 7%;
$\$36.40 \times .075 \times 1\frac{7}{12} = \$4.32$, at $7\frac{1}{2}$%, *Ans.*

6. $\$750.50 \times .05 \times 3\frac{1}{12} = \$115.70$, at 5%;
$\$750.50 \times .08 \times 3\frac{1}{12} = \$185.12$, at 8%;
$\$750.50 \times .09 \times 3\frac{1}{12} = \$208.26$, at 9%, *Ans.*

7. $\$1346.84 \times .0625 \times 2\frac{1}{3} = \$196.41$, at $6\frac{1}{4}$%, *Ans.*
$\$1346.84 \times .075 \times 2\frac{1}{3} = \$235.70$, at $7\frac{1}{2}$%, *Ans.*

8. $\$138.75 \times 10 \times 4\frac{1}{4} = \$58.97$, at 10%;
$\$138.75 \times .125 \times 4\frac{1}{4} = \$73.71$, at $12\frac{1}{2}$%, *Ans.*

9. $\$640 \times .07 \times 5\frac{1}{2} + \$640 = \$886.40$, *Ans.*

10. $\$56.64 \times .08 \times 3\frac{1}{4} + \$56.64 = \$71.37$, *Ans.*

11. $\$1040 \times .075 \times 1\frac{3}{4} + \$1040 = \$1176.50$, *Ans.*

12. From June 10, 1874, to Sept. 10, 1876—2 yr. 3 mo.;
$\$375 \times .08 \times 2\frac{1}{4} + \$375 = \$442.50$, *Ans.*

Art. 569.

2. $\$1.3725 \div 12 \times 18.3\frac{1}{3} \times 6 = \$12.58$, at 6%, *Ans.*
$\$1.3725 \div 12 \times 18.3\frac{1}{3} \times 4 = \$8.39$, at 4%, *Ans.*

3. $\$5.105 \div 12 \times 43.5 \times 5 = \$92.53$, at 5%, *Ans.*
$\$5.105 \div 12 \times 43.5 \times 8 = \$148.04$, at 8%, *Ans.*

4. $\$12.976 \div 12 \times 35.6 \times 7 = \$269.47$, at 7%, *Ans.*
$\$12.976 \div 12 \times 35.6 \times 7\frac{1}{2} = \$288.72$, at $7\frac{1}{2}$%, *Ans.*

5. $\$7.819 \div 12 \times 13.4 \times 7 = \$61.12$, *Ans.*

6. $\$30 \div 12 \times 11.7 \times 10 = \$292.50$, *Ans.*

7. $\$10.49 \div 12 \times 27.3 \times 6\frac{1}{2} + \$1049 = \$1204.12$, *Ans.*

8. $\$2.1675 \div 12 \times 41.3\frac{2}{3} \times 8 + \$216.75 = \$276.52$, *Ans.*

9. From Jan. 1, 1873, to May 10, 1875, is 2 yr. 4 mo. 9 da.; \$2.50 ÷ 12 × 28.3 × 7 = \$41.27, *Ans.*

10. From Aug. 20 to Dec. 18 is 3 mo. 28 da.;
\$4.0860 ÷ 12 × 3.9⅓ × 10 + \$408.60 = \$421.99, *Ans.*

11. From March 1, 1873, to July 16, 1875 = 2 yr. 4 mo. 15 da.; \$5.1562 ÷ 12 × 28.5 × 7 = \$85.72, *Ans.*

12. \$4000 cash = \$4000
35.00 ÷ 12 × 9 × 6 + \$3500 = \$3657.50
26.00 ÷ 12 × 18 × 6 + \$2600 = \$2834
24.00 ÷ 12 × 28 × 6 + \$2400 = \$2736 \$13227.50.

Art. 573.

2. \$597.25 × .038 = \$22.70, *Ans.*
3. \$418.75 × .009⅙ = \$3.84, *Ans.*
4. \$309.18 × .124 = \$38.34, *Ans.*
5. \$1298 × .187⅙ = \$242.94, *Ans.*
6. \$2000 × .159 = \$318, *Ans.*
7. \$4010 × .067⅙ = \$269.34, *Ans.*

Art. 574.

NOTE.—Exact interest differs from ordinary interest only, when the *time is in days.*

2. \$1600 × .06 = \$96 Int. for 1 year.
\$1600 × .06 ÷ 4 = \$24 Exact int. for 3 mo.
\$120, *Ans.*

3. \$648.40 × .08 × 1¼ = \$64.84 Int. for 1¼ yr.
\$648.40 × .08 ÷ 365 × 20 = \$ 2.84 Int. for 3 mo. 20 da.
= \$67.68 Exact int. for 1 yr. 3 mo. 20 da.
\$648.40 × .078⅓ × $\frac{4}{3}$ = \$67.72 Int. by 6% method.
Difference = \$.04, *Ans.*

4. $\$875.60 \times .07 \div 365 \times 63 = \$10.58$, *Ans.*

5. From May 1 till Oct. 15 is 167 da.;
$\$3000 \times .06 \div 365 \times 167 = \$82.36$, *Ans.*

6. From Nov. 1 till Apr. 10 is 160 da.;
$\$500 \times .05 \div 365 \times 160 = \$10.96$, *Ans.*

Art. 575.

1. $\$721.56 \times .081\frac{2}{3} = \$58.93$, *Ans.*

2. $\$54.75 \times .184 \times \frac{5}{6} = \$8.40$, *Ans.*

3. $\$1000 \times .058 \times \frac{7}{6} = \$67.67$, *Ans.*

4. $\$3046 \times .039\frac{1}{3} \times \frac{4}{3} = \$159.74$, *Ans.*

5. April 1 till Nov. 12 is 7 mo. 11 da.;
$\$1821.50 \times .036\frac{5}{6} = \$67.09$, *Ans.*

6. Jan. 15 till Aug. 1 = 6 mo. 16 da.;
$\$700 \times .032\frac{2}{3} \times \frac{5}{3} = \$38.11$, *Ans.*

7. Oct. 20 till March 10 = 4 mo. 20 da.;
$\$316.84 \times .023\frac{1}{3} \times \frac{7}{6} = \$8.63$, *Ans.*

8. $\$3146 \times .136\frac{2}{3} \times \frac{7}{6} + \$3146 = \$3647.61$, *Ans.*
$\$96.85 \times .189\frac{1}{2} + \$96.85 = \$115.20$, *Ans.*

9. $\$96.85 \times .139\frac{1}{2} + \$96.85 = \$115.20$, *Ans.*

10. $\$1008.80 \times .052\frac{2}{3} \times \frac{13}{12} + \$1008.80 = \$1066.36$, *Ans.*

11. $\$2000 \times .0025 \times \frac{25}{12} = \$2000 = \$2010.42$, *Ans.*

12. $\$137.60 \times .021\frac{1}{6} \times \frac{5}{3} + \$137.60 = \$142.45$, *Ans.*
From June 1, 1874, till Apr. 1, 1876 = 1 yr. 10 mo.

13. $\$1671.64 \times .11 \times \frac{7}{6} + \$1671.64 = \$1886.17$, *Ans.*

14. From Feb. 1, 1872, till Sept. 25, 1875 = 3 yr. 7 mo. *24 da.;* $\$600 \times .219 = \$131.40$, *Ans.*

15. Receiving 10% and paying 7% he gains 3%;
$\$9700 \times .03 = \$291$, *Ans.*

16. From Dec. 12, 1873, till July 3, 1875 = 1 yr. 6 mo. 21 da.; $\$127.36 \times .0935 \times \frac{3}{4} = \$8.93$, *Ans.*

17. From June 5, 1874, till Feb. 14, 1875 = 8 mo. 9 da.;
$\$250 \times .0415 \times \frac{4}{3} + \$250 = \$263.83$, *Ans.*

18. Time, less 3 mo. = 2 yr. 4 mo. 11 da.;
$\$710.50 \times .141\frac{5}{6} \times \frac{7}{6} + \$710.50 = \$828.07$, *Ans.*

19. He lost each year $12\frac{1}{2}\% - 7\frac{1}{2}\% = 5\%$;
$\$16840 \times .05 \times 2.3 \times \$1936.60$, *Ans.*

20. Time = 4 yr. 6 mo. 20 da.;
$\$2876.75 \times .273\frac{1}{3} \times \frac{4}{3} + \$2876.75 = \$3925.16$, *Ans.*

21. $\$9675 \div \$6.25 = 1548$ = No. of bbl. purchased;
$\$7.375 \times 1548 = \$11416.50$, cash rec'd for flour;
$\$9675 \times .064\frac{1}{6} + \$9675 = \$10295.81$, cost of flour with interest till sold, 1 yr. 25 da.;
$\$11416.50 - \$10295.81 = \$1120.69$, *Ans.*

22. $\$10000 \times .024\frac{1}{3} = \$243.33$. a'mt paid in Boston;
$\$10000 \times .08 \div 365 \times 146 = \$320$; $\$320 - \$243.33 = \$76.67$, *Ans.*

23. $\$36 \times 450 = \$16200$, cost of land;
$\$16200 \times .224 \times \frac{11}{12} + \$16200 = \$19526.40$, cost with interest;
$\$40 \times \overline{\frac{2}{5} \text{ of } 450} = \$7200$; $\$38.50 \times \overline{\frac{3}{5} \text{ of } 450} = \$10395$;
$\$7200 + \$10395 = \$17595$, total receipts;
$\$19526.40 - \$17595 = \$1931.40$, loss, *Ans.*

Art. 577.

2. \$49.50 ÷ .075 = \$660 ; \$49.50 ÷ .0625 = \$792, *Ans.*

3. \$153.75 ÷ .022$\frac{1}{6}$ = \$6936.09 ;
\$153.75 ÷ .025$\frac{1}{3}$ = \$6069.08, *Ans.*

4. \$213 ÷ .412$\frac{2}{3}$ = \$516.71, *Ans.*

5. \$173.97 ÷ .26 = \$669.12; \$173.97 ÷ 52 = \$334.56, *Ans.*

6. \$350 ÷ .035 = \$10000, *Ans.*

Art. 579.

2. \$1028 ÷ 1.028 = \$1000, *Ans.*

3. \$1596 ÷ 1.1375 = \$1403.08, *Ans.*

4. \$1531.50 ÷ 1.021 = \$1500, *Ans.*

5. \$918.73 ÷ 1.033$\frac{1}{12}$ = \$889.25, *Ans.*

6. \$761.44 ÷ 1.17 = \$650.80, *Ans.*

Art. 581.

2. \$68.11 ÷ (\$2085 × .01 × $\frac{7}{15}$) = 7%, *Ans.*

3. \$252 ÷ (\$1500 × .01 × 2.4) = 7%, *Ans.*

4. \$1189 ÷ (\$14500 × .01 × 1) = 8$\frac{1}{5}$%, *Ans.*

5. \$1684.50 — \$1500 ÷ (\$1500 × .01 = 2.05) = 6%, *Ans.*

6. \$120 ÷ (\$2000 × .01 × 3) = 2% a month, *Ans.*

7. \$1620 ÷ (\$15600 × .01 × 1) = 10$\frac{5}{13}$%, *Ans.*

8. \$1 ÷ (\$1 × .01 × 4) = 25%, *Ans.*

9. \$2 ÷ (\$1 × .01 × 2) = 100%, *Ans.*

10. \$297 × 12 ÷ (\$49500 × .01 × 1) = 7$\frac{1}{5}$%, *Ans.*

11. $\$168$ int. shows 4% gain in 6 mo.;

$\$168 + \overline{\$168 \times 1.04} = \$342.72$, annual yield from the first investment;

$\$342.72 \div (\$4200 \times .01 \times 1) = 8.18+$; $8\frac{9}{50}\% =$ 1st rate;

$\$712.50 \div (\$7500 \times .01 \times 1) = 9\frac{1}{2}$; $9\frac{1}{2}\% =$ 2d rate;

Difference in favor of latter investment $= 1\frac{8}{25}\%$, *Ans.*

Art. 583.

2. $\$6.43 \div \overline{\$175.12 \times .06} = .612$; .612 yr. = 7 mo. 10 da.

3. $\$1500 - \$1000 \div \overline{\$1000 \times .075} = 6\frac{2}{3}$;
$6\frac{2}{3}$ yr. = 6 yr. 8 mo., *Ans.*

4. $\$1250 \div \overline{\$8750 \times .02} = 7.14$; 7.14 mo. = 7 mo. 4 da.

5. $\$1522.88 - \$1301.64 \div \overline{\$1301.64 \times .05} = 3.4$;
3 yr. 4 mo. 24 da., *Ans.*

6. See note, Art. 581; $\$1 \div \overline{\$1 \times .03 \times 1} = 33\frac{1}{3}$;
33 yr. 4 mo., *Ans.*

7. $\$2 \div \overline{\$1 \times .04 \times 1} = 50$; 50 yr., *Ans.*

8. $\$120 \div \overline{\$120 \times .08 \times 1} = 12.5$; 12. yr. 6 mo., *Ans.*
$\$60 \div \overline{\$120 \times .08 \times 1} = 6.25$; 6 yr. 3 mo., *Ans.*
$\$240 \div \overline{\$120 \times .08 \times 1} = 25$; 25 yr., *Ans.*

Art. 586.

2. $\$350 \times 1.07 \times 1.07 \times 1.07 = \$428.77$, *Ans.*

3. $\$1200 \times 1.05 \times 1.05 \times 1.05 - \$1200 = \$189.15$, *Ans.*

4. $\$864.50 \times 1.08 \times 1.08 \times 1.08 \times 1.08 = \$1176.14$, *Ans.*

5. $\$680 \times 1.035 \times 1.035 \times 1.035 \times 1.035 - \$680 = \$100.32$, *Ans.*

6. $\$460\times1.015\times1.015\times1.015\times1.015\times1.015\times1.013-\$460=\$41.99$, *Ans.*

7. $\$1250\times1.025$ *seven times* $\times1.006\frac{2}{3}=\$1495.77$, *Ans.*

8. $\$790\times1.02\times1.02\times1.02\times1.006-\$790=\$53.38$.

10. $\$749.25\times1.989789=\$1490.85$, am't for 10 yr.;
$\$1490.85\times.02\times\frac{7}{6}+\$1490.85=\$1525.64$, am't for 10 yr. 4 mo., *Ans.*

11. $\$1500\times1.272279=\$1908.42$, am't for 3 yr. 6 mo.;
$\$1908.42\times.023\times\frac{7}{6}+\$1908.42=\$1959.63$, a'mt for 3 yr. 10 mo. 18 da.;
$\$1959.63\div1.271\frac{5}{6}=\$1540.79$, *Ans.*

12. $\$850\times1.02$ *seven times* $\times1.011\frac{1}{3}=\$987.23$, *Ans.*

13. $\$500\times3.869684=\$1934.84$, *Ans.*

14. Time = 6 yr. 3 mo. 18 da.;
$\$12500\times1.425761\times1.018=\$18142.81$, *Ans.*

Art. 589.

2. $\$1500\times.07\times4=\$420$
$\$105\times.07\times6=\underline{44.10}$ $\$464.10$, *Ans.*

3. $\$3500\times.08\times10=\$2800$;
$280\times.08\times45=\$1008$, Int. on 1 year's int. for 45 yr.;
$\$3500+\$2800+\$1008=\$7308$, *Ans.*

4. $(\$2500\times.06\times6)+(\$150\times.06\times15)+\$2500==\$3535$, Annual int. 6 yr.;
$\$2500\times.1.418519=\$3546.30$, Comp. int. for 6 yr.;
$\$3545.30-\$3535=\$11.30$, *Ans.*

5. $(\$575\times.08\times9.5)+(\$46\times.08\times40.5)+\$575==\$1161.04$, *Ans.*

6. $(\$800\times.07\times4)+(\$56\times.07\times6)+\$800=\$1047.52$.

Art. 597.

3.	Principal	$1500
	Int. due June 5, 1872, 2 mo. 4 da. @ 5%	13.33
		1513.33
	Payment	500
	2d Principal	1213.33
	Int. due Oct. 15, 1872, 4 mo. 10 da.	21.91
		1235.24
	Payment	37.75
	3d Principal	1197.49
	Int. due May 1, 1873, 6 mo. 16 da.	32.60
		1230.09
	Payment	97.25
	4th Principal	1132.84
	Int. due Aug. 6, 1873, 3 mo. 5 da.	14.94
		1147.78
	Payment	495.00
		652.78
	Int. due Oct. 25, 1873, 2 mo. 19 da.	7.16
	Am't due Oct. 25, 1873	$659.94, *Ans.*

4.	Principal	$700.00
	Int. due Dec. 5, 1873, 1 mo. 4 da.	4.63
		704.63
	Payment	75.00
	2d Principal	629.63
	Int. due Jan. 10, 1874, 1 mo. 5 da.	4.29
		633.92

	633.92
Payment	350.00
3d Principal	283.92
Int. due Apr. 11, 1874, 3 mo. 1 da.	5.02
	288.94
Payment	11.25
4th Principal	277.69
Int. due May 15, 1874, 1 mo. 4 da.	1.84
	279.53
Payment	250.00
5th Principal	29.53
Int. due Sept. 1, 1874, 3 mo. 16 da.	.61
Am't due Sept. 1, 1874	$30.14, *Ans.*

5.	Principal	$497.39
	Int. due Nov. 3, 1874, 7 mo. 18 da.	18.90
		516.29
	Payment	57.50
	2d Principal	458.79
	Int. due June 15, 1875, 7 mo. 12 da.	16.98
		475.77
	Payment	22.25
	3d Principal	453.52
	Int. due Aug. 1, 1875, 1 mo. 16 da.	3.48
		457.00
	Payment	125.00
	4th Principal	332.00
	Int. due Sept. 15, 1875, 1 mo. 14 da.	2.43
		334.43

	334.43
Payment	175.00
5th Principal	159.43
Int. due Jan. 1, 1876, 3 mo. 16 da. .	2.82
Am't due Jan. 1, 1876 . . .	$162.25, *Ans.*

Art. 598.

2.	Am't of	$950.00	from	Jan. 25	till	Oct. 25,	274 da.,		$999.79
	"	$225.00	"	Mar. 2	"	"	237 da.,	$235.19	
	"	$174.19	"	May 5	"	"	173 da.,	179.95	
	"	$187.50	"	June 29	"	"	118 da.,	191.78	
	"	$79.15	"	Aug. 1	"	"	85 da.,	80.42	687.29
				Balance due Oct. 25, 1876,				*Ans.*	$312.50

3.	Am't of	$1750	from	April 5	till	Dec. 31,	270 da.,		$1827.67
	"	$190	"	May 10	"	"	235 da.,	$197.34	
	"	$230	"	July 1	"	"	183 da.,	236.92	
	"	$645	"	Aug. 5	"	"	148 da.,	660.69	
	"	$372	"	Oct. 1	"	"	91 da.,	377.56	1472.51
				Balance due Dec. 31, 1875,				*Ans.*	$355.16

Art. 603.

2. $\$287.75 \div 1.021 = \$281.83$, *Ans.*

3. $\$2202.90 - \overline{\$2202.90 \div 1.049} = \$102.90$, *Ans.*

4. $\$5500 + (\$16500 \div 1.09) - \$19500 = \$1137.61$, *Ans.*

5. $\$4200 - \overline{\$4200 \times .03} = \$4074$, cash price;
$\$4074 \times 1.02 = \$4117.65$; $\$4200 - \$4117.65 = \$43.65$.

6. $\dfrac{\$1500 \times .07}{3} + \dfrac{\$1000 \times .07}{4} = \$2552.50$ the value of amount paid at the end of 6 mo.

$\$3500 - \$2552.50 = \$947.50$, the bal. to be at the end of 6 mo.

$\$947.50 \div 1.0175 = \$931.203$, *Ans.* = present worth of bal. at the time of 2d payment.

7. Pres. worth of \$356.25, due in 2 mo. 16 da.=\$351.79
" " \$497.50 " 4 mo. 16 da.=\$486.47
Total due Sept. 15, 1875, *Ans.* \$838.26

8. \$300 × $.66\frac{2}{3}$=\$200, cost;
\$300 ÷ 1.03=\$291.26; Present worth of sale;
\$291.26 − \$200 ÷ \$200=.456+ =$45\frac{63}{100}$%, gain, *Ans.*

9. \$.1175 × 470 × 230 ÷ 1.0525=\$12068.17, Pres. worth of debt;
\$13000 − \$12068.17=\$931.83, gain, *Ans.*

10. \$8.75 ÷ 1.035=\$8.45+; \$8.60 ÷ $1.01\frac{1}{6}$=\$8.50+;
\$.05 per bbl. in favor of the former, *Ans.*

11. \$3750 × .15 = \$562.50 Cash payment.
\$3750 × .25 ÷ 1.015= \$923.65 Pres. w'th of 2d pay't.
\$3750 × .20 ÷ 1.02 = \$735.29 " 3d "
\$3750 × .40 × 1.03 =\$1456.31 " 4th "
Ans. \$3677.75 Cash value of debt.

Art. 615.

2. \$597.50 × .0105=\$6.27, Bank discount.
\$597.50 − \$6.27=\$591.23, Proceeds, *Ans.*

3. Am't of \$1615 for 93 da.=\$1644.20;
\$1644.20 − (\$1644.20 × .0155 × $\frac{7}{6}$)=\$1614.47, *Ans.*

4. \$62.50 × 173.59375=\$10849.61, price of farm;
Cash, \$2000;
\$8849.61 × 1.03325=\$9143.86, am't of note at maturity;
\$9143.86 × .03325=\$304,03, bank discount;
\$9143.86 − \$304.03=\$8839.83, proceeds of note;
\$2000 + \$8839.83=\$10839.83, *Ans.*

5. Date of maturity = July 27, 1875 + 3 mo. 3 da. = Oct. 30, 1875;

Term of discount = from Aug. 10 till Oct. 30 = 2 mo. 20 da.;

$\$957.37-(\$957.37\times.01\frac{1}{3}\times\frac{4}{3})=\$940.35$, proceeds.

6. Date of maturity Feb. 5 + 2 mo. 3 da. = Apr. 8, 1874;
Term of discount 1 mo. 17 da.;
$\$929.08-(\$929.08\times.007\frac{5}{6}\times\frac{5}{3})=\$916.95$, *Ans.*
$929.08 = am't of note at maturity.

7. Date of maturity, May 1 + 93 da. = Aug. 2, 1875;
Term of discount, May 15 till Aug. 2 = 2 mo. 17 da.;
$\$1315.75-(\$1315.75\times.012\frac{5}{6}\times\frac{7}{6})=\$1296.05$, Proceeds, *Ans.*

8. Date of maturity, June 12 + 6 mo. 3 da. = Dec. 15, 1876;
$\$1250\times1.0305=\$1288.13$, am't of note at maturity;
$\$1288.13\times.005=\$6.44$, bank disc't for 1 mo.;
$\$1288.13-\$6.44=\$1281.69$, proceeds, *Ans.*

Art. 617.

2. $\$1425\div\overline{1-.0064\frac{1}{6}}=\$1434.20$, *Ans.*

3. $\$675\div\overline{1-.062}=\$719.61$, *Ans.*

4. $\$1915.75\div\overline{1-.0180\frac{5}{6}}=\$1951.03$, *Ans.*

5. $\$2250\div\overline{1-.0180\frac{5}{6}}=\$2291.44$, *Ans.*

6. $\$315.23\div\overline{1-.019375}=\$321.46$, *Ans.*

7. $\$650\div\overline{1-.014\frac{35}{36}}=\$659.89$, *Ans.*

8. $\$2.625\times137\frac{3}{4}\div\overline{1-.0180\frac{5}{6}}=\$368.25$, *Ans.*

Art. 619.

2.

Date.	Balance.	Bal. on Int.	Int. 1 mo.
Feb. 1	$175		
March 1	175	$175	$.875
April 1	100	100	.50
May 1	160	100	.50
June 1	235	125	.625
July 1	185	185	.93
			$3.43

Due July 1, $185 + $3.43 = $188.43, *Ans.*

3.

Date.	Balance.	Bal. on Int.	Int. 1 mo.
Jan. 1	$350		
Feb. 1	200	$200	$1.00
March 1	150	150	.75
April 1	175	150	.75
May 1	175	175	.875
June 1	205	175	.875
July 1	230	130	.65
		Int. to be added July 1,	$4.90, *Ans.*

4.

Date.	Balance.	Bal. on Int.	Int. for Quarter.
July 1, 1874	$275		
Aug. 1	300		
Sept. 1	150		
Oct. 1	207	$150	$2.25
Nov. 1	557		
Dec. 1	489		
Jan. 1, 1875	364	207	3.11
		Int. due	$5.36

Due Jan. 1, 1875, $364 + $5.36 = $369.36, *Ans.*

5.

Date.	Balance.	Bal. on Int.	Int.
Jan. 1, 1874 . . .	\$136.00		
April 1	161.00	\$136.00	\$2.04
July 1	161.00	161.00	2.41
" Int. added	165.45		
Oct. 1	177.95	165.45	2.48
Jan. 1, 1875 . . .	177.95	177.95	2.67
" Int. added	183.10		
April 1	95.60	95.60	1.43
July 1	245.60	95.60	1.43
" Int. added	248.46		
Oct. 1	248.46	248.46	3.73
Jan. 1, 1876 . . .	320.36	248.46	3.73
" Int. added	\$327.92 = am't due, *Ans.*		

Art. 648.

2. $\$100\times\overline{.97\tfrac{3}{4}+.00\tfrac{1}{8}}\times 350=\$34256.25$, *Ans.*

3. $\$1000\times\overline{1.12\tfrac{1}{4}+.00\tfrac{1}{8}}\times 15=\$16856.25$, *Ans.*

4. $\$100\times\overline{1.27-.00\tfrac{1}{4}}\times 125=\$15843.75$, *Ans.*

Art. 649.

2. $\$27000\div(\$100\times 1.07\tfrac{3}{4}+.00\tfrac{1}{4})=250$, No. shares, *Ans.*

3. $\$21560\div(\$100\times .97\tfrac{3}{4}+.00\tfrac{1}{4})=220$, No. shares, *Ans.*

5. $\$990\div(\$100\times\overline{1.02\tfrac{1}{4}-.97\tfrac{1}{2}-.00\tfrac{1}{4}})=220$, No. shares.

6. $\$1680\div(\$100\times\overline{1.04-1.01+.00\tfrac{1}{2}})=480$, No. shares.

7. $\$1200\div(\$100\times\overline{1.16\tfrac{3}{4}-1.10\tfrac{1}{2}-.00\tfrac{1}{4}})=200$, No. shares, *Ans.*

Art. 650.

2. $\$85 \times \overline{\$1800 \div \$6} = \$25500$, *Ans.*

3. $\$105.50 \times \overline{\$2000 \div \$10} = \$21100$, *Ans.*

This is on the supposition that the first semi-annual dividend is not re-invested.

4. $\$63 \times \overline{\$550 \div \$5} = \$6930$, *Ans.*

Art. 651.

2. $\$10 \div \$112.50 = .08\frac{8}{9}$; $8\frac{8}{9}\%$, *Ans.*

3. $\$8 \div \$110 = .07\frac{3}{11}$; $7\frac{3}{11}\% =$ income ;
$\$5 \div \$75 = .06\frac{2}{3}$; $6\frac{2}{3}\% =$ income ;
The former is $\frac{20}{33}\%$ the better investment, *Ans.*

4. $\overline{\$6 \div \$84} - \overline{\$7 \div \$105} = .07\frac{1}{7} - .06\frac{2}{3} = .00\frac{10}{21}$; $\frac{10}{21}\%$, *Ans.*
In favor of the latter investment.

5. $\$10 \div \$106 = .09\frac{23}{53}$; $9\frac{23}{53}\%$, *Ans.*

6. $\$5 \div \$85 = .05\frac{15}{17}$; $5\frac{15}{17}\%$, *Ans.*

7. The average depreciation each year is $\frac{1}{15}$ of 10% or $\frac{2}{3}\%$. My average income from each share is then $\$4\frac{1}{3}$; $\$4\frac{1}{3} \div \$110 = .03\frac{31}{33}$; $3\frac{31}{33}\%$, *Ans.*

Art. 652.

2. $.05 \div .08 = .625 = 62\frac{1}{2}\%$, *Ans.*

3. $.10 \div .075 = 1.33\frac{1}{3}$; $1.33\frac{1}{3} - 1 = .33\frac{1}{3} = 33\frac{1}{3}\%$, *Ans.*

4. $.05 \div .07 = .71\frac{3}{7} = 71\frac{3}{7}\%$, *Ans.*

5. $.06 \div .07\frac{1}{2} = .80$; $\$50 \times .80 = \$40$, *Ans.*

6. $.06 \div .08 = .75$; $.06 \div .09 = .66\frac{2}{3}$; $.06 \div .10 = .60$;
75%, $66\frac{2}{3}\%$, 60%, *Ans.*

Art. 653.

2. $\$1.09\frac{7}{8} \times 4975 = \$5466.28$, *Ans.*

3. $\$8000 \times .06 \div 2 = \$240$ = semi-annual int. in gold;
$\$1.11\frac{3}{4} \times 240 = \$268.20$, *Ans.*

4. $\$1.09\frac{5}{8} \times 6625 = \$7262.66$;
$\$7262.66 - \$7000 = \$262.66$; better to pay in currency.

Art. 654.

2.

$$\$4500 \div \begin{cases} 1.125 = \$4000, \textit{ Ans.} \\ 1.115 = \$4035.87, \textit{ Ans.} \\ 1.095 = \$4109.59, \textit{ Ans.} \end{cases}$$

3. $\$2210 \div 1.105 = \$2000$ semi-annual income; $4000 annual income.
$\$4000 \div .06 = \$66666\frac{2}{3}$, am't of 6's bought;
$\$1.11 \times 66666\frac{2}{3} = \$74000$, money invested, *Ans.*

4. $\$109737.50 \div .0625 = \$1755800$, *Ans.*

5. $\$1450 - \overline{\$8500 \times .02\frac{3}{4}} = \$1216.25$, net income from house;
$\$15300 \div .90 \times .07 = \$1190$, present income;
$\$1216.25 - \$1190 = \$26.25$, yearly loss, *Ans.*

6. $\$36500 \div .85 \times .06 = \$2576.47$, income from former;
$\$36500 \div .95 \times .07 = \$2689.47$, income from latter;
$\$2689.47 - \$2576.47 = \$113$, *Ans.*

7. 3 years' int. on mortgage + $250 = $1300, income for 3 years;
3 years' dividends + 3% gain on stocks = $1350, income for 3 years;
$\$1350 - \$1300 = \$50$, in favor of stock investment;
$\$50 \div \overline{\$4750 \times .01 \times 3} = .00\frac{20}{57} = \frac{20}{57}\%$ yearly, Ans.

8. $\$1$ will buy $\$\frac{100}{108}$ of N. Y. 6's, yielding at 6%, $\$.05\frac{5}{9}$;
$\$2$ will buy $\$\frac{200}{99}$ of U. S. 5's, yielding at 5%, $\$.10\frac{10}{99}$;
$\$.05\frac{5}{9}+\$.10\frac{10}{99}=\$.15\frac{65}{99}$, income from $\$3$ invested;
$\$3348\div\$.15\frac{65}{99}=21384$; $\$3\times 21384=64152$;
$\frac{1}{3}$ of $\$64152=\$21384$, invested in N. Y. 6's;
$\frac{2}{3}$ of $\$64152=\$42768$, invested in U. S. 5's.

9. $\$12480\div 1.04\times .06=\$720$, income in gold;
$\$1.10\times 720=\$792$, *Ans.*

Art. 664.

2. $\$5700\times .0075=\$42.75$, *Ans.*

3. $\$2750\times .00\frac{7}{8}=\$24.07$, *Ans.*

4. $\$15000\times .01\frac{1}{4}=\$187.50$, *Ans.*

5. $\overline{\$25000\times .01\frac{3}{4}}-\overline{\frac{1}{2}\text{ of }\$25000\times .02\frac{1}{4}}=\$156.25$, *Ans.*

Art. 665.

2. $\$280\div\$16000=.0175$; $1\frac{3}{4}\%$, *Ans.*

3. $\$4.30\div\$860=.005$; $\frac{1}{2}\%$, *Ans.*

4. $\overline{\$20000\times .00\frac{3}{4}}+\overline{\$30000\times .00\frac{1}{2}}=\$300$;
$\$300\div\$50000=.006$; $\frac{3}{5}\%$, *Ans.*

Art. 666.

2. $\$93.50\div .01\frac{3}{8}\times 2=\$13600$, *Ans.*

3. $\$245\div .04\frac{3}{8}\div\frac{5}{8}=\$8960$, *Ans.*

5. $\$22163\div .9974=\$22220.77$, *Ans.*

6. $\$35000\div(1-\overline{.90\text{ of }\frac{1}{4}\%})=\$35078.93$
$\$9500\div(1-.0056\frac{1}{4}) = \$9553.74$
$\$4500\div(1-.003\frac{3}{8}) = \underline{\$4515.24\quad \$49147.91,}$ *Ans.*

7. $73.50 ÷ .004 ÷ ¾ = $24500, *Ans.*

8. $25200 ÷ 1.0175 = $24766.58, *Ans.*

9. $107.25 ÷ .0325 ÷ .80 × 1.20 ÷ 500 = $9.90, *Ans.*

Art. 675.

2. $37.97 × 7.5 = $284.78, *Ans.*

3. $105.53 × 10 = $1055.30, *Ans.*

5. $105.53 × 5 = $527.65, *Ans.*

6. $105.53 × 5 × 9 + ($527.65 × .06 × 36) = $5888.57.

If he dies immediately after the 9th payment, he will lose 8 yr. int. on the first payment, 7 yr. on the second, etc., 36 yr. in all.

7. $26.38 × 5 × 9 + ($26.38 × 5 × .06 × 36) = $1472.
$5888.57 − $1472 = $4416.57, *Ans.*

8. $501.69 × 7.5 = $3762.68;
Int. for 3 yr. 5 mo. = $771.35;
$3762.68 + $771.35 = $4534.03, cost by first plan;
$37.97 × 7.5 × 4 = $1139.10, cash pay'ts by 2d plan;
$284.78 × .06 × 7⅔ = $131, annual int. on payments;
3 yr. 5 mo. + 2 yr. 5 mo. + 1 yr. 5 mo. + 5 mo. = 7 yr. 8 mo. = 7⅔ yr.
$1139.10 + $131 = $1270.10, cost at death by second plan;
$4534.03 − $1270.10 = $3263.93, *Ans.*

9. $104.16 × .85 × 5 × 10 = $4426.80, cash prem. paid.
Int. on $442.68 at 7% for 55 yr. = $1704.32;
$4426.80 + $1704.32 − $5000 = $1131.12, loss, Ans.

10. First pay't with comp. int. for 3 yr. 6 mo. = $1376.81
Second " " 2 yr. 6 mo. = 1286.74
Third " " 1 yr. 6 mo. = 1202.56
Fourth " interest 6 mo. = 1123.89
Total payments with comp. int. added = $4990.00
$12190 — $4990 = $7200, *Ans.*

Art. 685.

2. $11123 ÷ .98 = $11350, *Ans.*

3. $18500 ÷ .97 = $19072.16, *Ans.*

4. $1260.52 ÷ .965 = $1306.24;
$1306.24 ÷ .00325 = $401920, *Ans.*

7. $\$17.40+\$4.35+\$.783+\$.052+\overline{\$.50\times 5}=\$25.09.$

8. $\$78.30+\$6.09+\$.696+\$.044+\overline{\$.75\times 3}=\$87.38.$

9. $\$104.40+\$2.61+\$.435+\$.052+\overline{\$1.25\times 4}=$ $112.50, *Ans.*

10. $\$217.50+\$3.48+\$.696+\$.078+\overline{\$.95\times 5}=\$226.50.$

Prop.	Tax.	Prop.	Tax.	Prop.	Tax.	Prop.	Tax.
$1	$.0228	$9	$.2052	$80	$1.824	$700	$15.96
2	.0456	10	.228	90	2.052	800	18.24
3	.0684	20	.456	100	2.28	900	20.52
4	.0912	30	.684	200	4.56	1000	22.80
5	.1140	40	.912	300	6.84	2000	45.60
6	.1368	50	1.14	400	9.12	3000	68.40
7	.1596	60	1.368	500	11.40	4000	91.20
8	.1824	70	1.596	600	13.68	5000	114.00

This table is true only to the 4th decimal place.

11. $\$11384 \div .9675 = \$11766.41$, total tax raised;
$\$11766.41 - \overline{\$1.25 \times 760} = \$10816.41$, property tax;
$\$10816.41 \div \$474000 = .0228+$, rate of taxation.
$\$6750 + \$2500 = \$9250$. By the table the
$\text{Tax} = \$205.20 + \$4.56 + \$1.14 + \overline{\$1.25 \times 3} = \$214.65$.

12. Tax on $\$17750 = \$387.60 + \$15.96 + \$1.14 + \overline{\$1.25 \times 5} = \$410.95$, *Ans.*

13. $\$205.20 + \$15.96 + \$1.824 + \$.137 + \$1.25 = \$224.37$.

14. $\$7500 \times (.0175 + .00125 + .005) = \$178.13$, *Ans.*

15. $\$916.65 \div .97 \div .00225 = \$420000$, *Ans.*

Art. 700.

2. $\$.985 \times 1590 = \$1566.15$, *Ans.*

4. $\$1.015 - \$.0064\frac{1}{6}$ (bank disc't 33 da.) $\times 4720 = \$4760.51$, *Ans.*

5. $\$.995 - \$.0180\frac{5}{6}$ (bank disc't) $\times 5275 = \$5153.24$.

6. $\overline{\$1.01375 - \$.0155} \times 6400 = \$6388.80$, *Ans.*

7. $\overline{\$1.02125 - .0180\frac{5}{6}} \times 5600 = \$5617.73$, *Ans.*

Art. 701.

2. $\$797.50 \div \overline{1.025 - .01225} = \$787.46$, *Ans.*

3. $\$711.90 \div .98\frac{7}{8} = \$720$, *Ans.*

4. $\$.115 \times 2780 \times .975 \div .985 - \$316.45$, *Ans.*

5. $\$2283.1875 \div 1.0125 \div .05 \div 100 = 451$, *Ans.*

6. $\$5141.78 \div \$5320 = .9665$ cost of exchange.
Bk disct. for 63 $= \underline{.01225}$ of \$1.
$.97875$ course of exchange.

7. $\$.125 \times 520 \times 250 \times 1.25 \times .985 \div .995 = \$20108.35$.

Art. 706.

2. £473 5s. 9d.=£473.2875;
$4.8665 × 473.2875=$2303.25, *Ans.*

3. £625 4s. 3d.=£625.2125;
$4.835 × 625.2125=$3022.90, gold;
$1.0975 × 3022.90=$3317.63, in currency, *Ans.*

5. 697.5 fr.÷5.175 fr.=134.78; $134.78, *Ans.*

6. 1665 fr.÷5.15625 fr.=320.97; $320.97, gold;
$1.09⅞ × 320.97=$352.67, currency, *Ans.*

8. $.9625÷4 × 1750=$421.09, *Ans.*

9. $.95375÷4 × 2155 × 1.1025=$566.50, *Ans.*

11. $.41125 × 1950—$801.94, *Ans.*

12. $\overline{\$.4125 \times 3750} + \overline{\$.955 \div 4 \times 1000} + \overline{\$4.85 \times 500} \times 1.09\frac{3}{4} = \$4621.16$, *Ans.*

13. $.4175 × 12560=$5243.80, *Ans.*

14. $.9425÷4 × 13550 × 1.095 × 1.00125=$3500.40.

Art. 707.

2. $7500÷$4.86=1543.21; £1543.21=£1543 4s. 2d.

4. $550÷$.94875 × 4=2318.8; 2318⅘+ marks, *Ans.*

5. $395.75÷$.95125 × 4=1664+; 1664+marks, *Ans.*

7. 5.155 fr. × 6186=31888.83 fr., *Ans.*

8. 5.1675 fr. × 2500=12918.75 fr., *Ans.*

Art. 711.

2. 750 M.÷4 × 4.91 × 920.625, No. of fr. in Paris;
920.625 fr.÷5.15 fr.=178.76, No. dollars sent from
Boston; $1.00¼ × 178.76=$179.21, cost in Boston.

5. *x* fr. = $1
$4.845 = £1
£1 = 25.73 fr.; *x*=5.31 fr.+, *Ans.*

6. $*x* = £1
£1 = 25.71 fr.
5.155 fr. = $1; *x*=$4.987, *Ans.*

7. £*x* = $5000 1.22 fr. = 1 M.
$1 = 5.18 fr. 1.70 M. = 1 guil.
11.83 guil. = £1; *x*=£1055 12s. 3d., *Ans.*
$5000÷$4.83½=1034.126; £1034 2s. 6.26d.;
£21 9s. 8.74d., gain.

8. $*x* = 35000 fr.
£1 = $4.83
25.12 fr. = £1
1 = 1.005; *x*=$6763.34, indirect exchange.
35000 fr.÷5.15 fr.=6796.12 = No. of dollars by direct exchange.
$6796.12−$6763.34 = $32.78, in favor of indirect exchange, *Ans.*

9. *x* guilders = $4500
$4.875 = £1
£1 = 11.175 guilders
1 = .995
1.005 = 1; *x*=10212.4 guilders.
$4500÷$.4125=10909+, No. of guilders by direct exchange.
10909.09 guil.−10212.4 guil.=696.6 guil. loss by indirect exchange, *Ans.*

10. $75 × 165 = $12375, cost in New Orleans.
$$x$ Cin. = $12375, N. O.
$1 N. O. = $.99625 N. Y.
$1 N. Y. = $1.02, Cin.
1 = $1.00\frac{1}{3}$; x=$12617.08, cost in Cincin.

Art. 726.

2. $.0175 × 500 × 50=$437.50, *Ans.*

3. $7.50 × 350 × .25=$656.25, Ad valorem duty.
$2.50 × 12 × $\frac{100\times350}{1000}$=$1050, specific duty.
$656.25 + $1050=$1706.25, *Ans.*

4. $6 × 100=$600, duty on champagne.
$.60 × 30 × 25=$450, specific duty on sherry.
$13 × 100 × .25=$325, ad. val. duty on the champ.
$2.50 × 30 × 25 × .25=$468.75, ad val. duty on the sherry.
$600 + $450 + $325 + $468.75=$1843.75, *Ans.*

5. ($125 × 25 × .35) + ($37.50 × 15 × .25)=$1234.38.

6. 1440 pt. × .975=1404 pt.=175.5 gal.
$.36 × 175.5=$63.18, *Ans.*

7. $.055 × 24 × $1\frac{1}{4}$ × 175 × 20=$5775, *Ans.*

8. $.50 × 213.5 × 10 = $1067.50 sp. duty.
19375 fr. × .35 × .193 = 1308.78 No. of dollars ad val. duty.
19375 fr. ÷ 5.155 fr. = 3758.49 value of inv. in dol.
Charges = 67.50
$6202.27 in gold.

$1.10 × 6208.96=$6829.86, cost in currency, *Ans.*

9.
$$\begin{array}{rrl} 7125\text{ fr.}\times .25 = & 1781.25\text{ fr.} & \text{duty.}\\ & 7125 & \text{invoice.}\\ & 13.5 & \text{charges.}\\ 7125\text{ fr.}\times .025 = & \underline{178.125} & \text{com.}\\ & 9097.875\text{ fr.} & \end{array}$$
$\$.193 \times 9097.875 = \$1755.89$, *Ans.*

10.
$$\begin{array}{rr} \$.50 \times 695 = & \$347.50\\ \$4.8665 \times 375.5 \times .35 = & \underline{639.58}\\ & \$987.08 \end{array}$$
Ans.

Art. 733.

2.
$$\begin{array}{rr} \$800 \times 1 = & \$800\\ 750 \times 4 = & 3000\\ \underline{1000} \times 6 = & \underline{6000}\\ \$2550 \times x = & \$9800 \end{array}$$
$x = \$9800 \div \$2550 = 3.84$; 3.84 mo. average term of credit = 3 mo. 25 da., *Ans.*

3.
$$\begin{array}{rr} \$500 \times 3 = & \$1500\\ 750 \times 6 = & 4500\\ \underline{1200} \times 9 = & \underline{10800}\\ \$2450 \times x = & \$16800 \end{array}$$
$x = 6.85$ mo.; av. term of credit = 6 mo. 26 da. Dec. 1, 1876 + 6 mo. 26 da. = June 27, 1877, *Ans.*

4.
$$\begin{array}{rr} \$350 \times 2 = & \$700\\ 500 \times 3 = & 1500\\ \underline{700} \times 6 = & \underline{4200}\\ \$1550 \times x = & \$6400 \end{array}$$
$x = 4.13$ mo.; average term of credit = 4 mo. 4 da. Jan. 1, 1875 + 4 mo. 4 da. = May 5, 1875, *Ans.*

5. $\underline{\$1680}$
$$\begin{array}{rr} 560 \times 5 = & \$2800\\ 420 \times 3 = & 1260\\ 336 \times 2 = & 672\\ \underline{280} \times 1 = & \underline{280}\\ \$84 \times x = & \$5012 \end{array}$$
$x = 59\frac{2}{3}$ mo.; 4 yr. 11 mo. 20 da., or 5 yr. 7 mo. 20 da. after last payment, *Ans.*

\$84 is the amount yet due.

7. $\underline{\$2500}$

$$\begin{array}{rl} 250 \times 5 = & \$1250 \\ 300 \times 3 = & 900 \\ \underline{500} \times 1 = & \underline{500} \\ \$1450 \times x = & \$2650 \end{array}$$

$x = 1.82+$; bal. is due 1 mo. 25 da. after Oct. 1, or Nov. 26, *Ans.*

8.

$$\begin{array}{rl} \$225 \times 35 = & \$7875 \\ 350 \times 60 = & 21000 \\ \underline{750} \times 90 = & 67500 \\ \$1325 \times x = & \$96375 \end{array}$$

$x = 73$; average term of credit $= 73$ da.

Dec. 15 + 73 da. = Feb. 26, *Ans.*

9.

$$\begin{array}{rl} \$300 \times 0 = & \$\text{——} \\ 360 \times 3 = & 1080 \\ 240 \times 4 = & 960 \\ \underline{300} \times 6 = & \underline{1800} \\ \$1200 \times x = & \$3840 \end{array}$$

$x = 3.2$; time of payment = Dec. 1, 1874 + 3 mo. 6 da. = Mar. 7, 1875.

$\$1200 \div 1.018\frac{2}{3} = \$1178.01$, cash value of goods at purchase.

Art. 734.

2.

Due.	Amt.		No. days.		Products.
April 30 . . .	800	×	0	=	0
May 15	350	×	15	=	5250
Sept. 20 . . .	3800	×	143	=	543400
	4950	×	x	=	548650

$x = 111$; Apr. 30 + 111 da. = Aug. 19, 1875, *Ans.*

3.

Due.	Amt.		No. da.		Products.
May 15 . . .	375	×	42	=	15750
April 3 . . .	550	×	0	=	0
July 25 . . .	1100	×	113	=	124300
May 2	250	×	29	=	7250
	2275	×	x	=	147300

$x = 65$; Apr. 3 + 65 da. = June 7, 1876, *Ans.*

4.

Due.	Amt.		No. da.		Products.
May 1	650	×	0	=	0
June 10 . . .	380	×	40	=	15200
July 12 . . .	900	×	72	=	64800
" 18 . . .	350	×	78	=	27300
August 3 . .	600	×	94	=	56400
	2880	×	x	=	163700

$x=57$; May 1 + 57 da. = June 27, 1874, equated time.
Discounted April 5 for 2 mo. 22 da.
$2880 ÷ $1.05\frac{7}{15}$ = $2730.72 ;
$2880 − $2730.72 = $149.28, *Ans.*

5.

Due.	Amt.		No. da.		Products.
April 9 . . .	835	×	0	=	0
" 17 . . .	320	×	8	=	2560
" 25 . . .	475	×	16	=	7600
May 5 . . .	600	×	26	=	15600
" 12	250	×	33	=	8250
	2480	×	x	=	34010

$x=14$; April 9 + 14 da. = Apr. 23, 1874, *Ans.*

6. Due.	Amt.	Time on Int.	Int.	Amt.
Dec. 15, 1875	$275	7 mo. 25 da.	$12.57	$287.57
" 9, "	351.50	8 mo. 1 da.	16.47	367.97
Nov. 27, "	415.75	8 mo. 13 da.	20.45	436.20
Mar. 3, 1876	500	5 mo. 7 da.	15.26	515.26
" 15, "	710	4 mo. 25 da.	20.02	730.02
		Amt. due Aug. 10, 1876,		$2337.02

7.

Due.	Amt.		No. da.		Products.
April 1, 1875 . .	425	×	0	=	0
May 10, “ . .	615	×	39	=	23985
“ 28, “ . .	1500	×	57	=	85500
June 10, “ . .	750	×	70	=	52500
	3290	×	x	=	161985

$x=49$; Apr. 1, 1875 + 49 da. = May 20, 1875, *Ans.*

Art. 737.

2. Due.	Amt.		Da.		Prod.	Paid.	Amt.		Da.		Prod.
Nov. 5, 1874,	720	×	26	=	18720	Oct. 10, 1874,	500	×	0	=	0
“ 10, “	850	×	31	=	26350	Feb. 16, 1875,	450	×	129	=	58050
“ 3, “	1200	×	24	=	28800	Dec. 25, 1874,	900	×	76	=	68400
June 20, 1875,	620	×	253	=	156860	Jan. 3, 1875,	250	×	85	=	21250
	3390				230730		2100				147700
	2100				147700						
	1290				)83030						

64; Oct. 10, 1874 + 64 da. = Dec. 13, 1874, *Ans.*

3. Due.	Amt.		Da.		Prod.	Paid.	Amt.		Da.		Prod.
July 31,	950	×	0	=	0	Aug. 1,	700	×	1	=	700
Sept. 4,	300	×	35	=	10500	Sept. 20,	1000	×	51	=	51000
Nov. 7,	1900	×	99	=	188100	Nov. 1,	1200	×	93	=	111600
Dec. 19,	2600	×	141	=	366600						
	5750				565200		2900				163300
	2900				163300						
	2850				)401900						
					141						

July 31 + 141 da. = Dec. 19, 1877, *Ans.*

4. Due.	Amt.		Da.		Prod.	Paid.	Amt.		Da.		Prod.
May 20,	570	×	95	=	54150	Feb. 4,	490	×	0	=	0
“ 28,	300	×	103	=	30300	Mch. 1,	1000	×	15	=	15000
June 11,	720	×	117	=	84240	Apr. 2,	1800	×	47	=	84600
“ 26,	835	×	132	=	110220						
July 10,	1150	×	146	=	167900						
“ 28,	960	×	164	=	157440						
Aug. 15,	475	×	182	=	86450						
	5010				690700		3290				99600
	3290				99600						
	1720				)591100						
					344						

Feb. 14, 1878 + 344 da. =
Jan. 24, 1879, *Ans.*

Art. 738.

2. Due.	Amt.		Da.		Prod.	Paid.	Amt.		Da.		Prod.
May 1,	1500	×	0	=	0	July 1,	450	×	61	=	27450
Aug. 15,	750	×	106	=	79500	“ 15,	370	×	75	=	27750
	2250				79500		820				55200
	820				55200						
	1430				)24300						
					17						

May 1 + 17 da. = May 18.

From May 18 till Dec. 10 = 6 mo. 22 da.

Amt. of $1430 for 6 mo. 22 da. @ 7% = $1486.17, *Ans.*

3. Due.	Amt.		Da.		Prod.	Paid.	Amt.		Da.		Prod.
Oct. 9, 1875,	751.35	×	6	=	4508.10	Oct. 3, 1875,	300	×	0	=	0
“ 5, “	425	×	2	=	850	Feb. 13, 1876,	450	×	133	=	59850
Jan. 30, 1876,	927.83	×	119	=	110411.77	Dec 20, 1875,	500	×	78	=	39000
“ 4, “	1200	×	93	=	111600						
	3304.18				227369.87		1250				98850
	1250				98850						
	2504.18				)128519.87						
					63						

Oct. 3, 1875 + 63 da. =
Dec. 5, 1875, *Ans.*

4. From Dec. 5 till Jan. 1, are 27 da.
Amt. of $2054.18 for 27 da. @10%=$2069.59, *Ans.*

5. Due.	Amt.		Da.		Prod.	Paid.	Amt.		Da.		Prod.
May 4,	1600	×	63	=	100800	June 1,	500	×	91	=	45500
Apr. 6,	1500	×	35	=	52500	Mar. 2,	2000	×	0	=	0
June 9,	3000	×	99	=	297000	" 25,	3150	×	23	=	72450
May 28,	2500	×	87	=	217500	Apr. 16,	800	×	45	=	36000
	8600				667800		6450				153950
	6450				153950						
	2150				)513850						
					239						

March 2, + 239 da.=
Oct. 27, equated time.

If paid July 1, it must be discounted for 3 mo. 26 da.
$2150÷1.022$\frac{5}{9}$=$2102.58, *Ans.*

6. Due.	Amt.		Da.		Prod.	Paid.	Amt.		Da.		Prod.
Apr. 2,	87.25	×	0	=	0	Oct. 25,	600	×	206	=	123600
May 15,	35.75	×	43	=	1537.25	Sept. 3,	300	×	154	=	46200
						Oct. 1,	500	×	182	=	91000
	123.00				1537.25		1400				260800
							123				1537.25
							1277				)258262.75
											203.00

Apr. 2+203 da.=Oct. 22, equated time.

A note for 60 da., dated Aug. 1, is due Sept. 30, 22 days before the equated time.

$1277÷1.003$\frac{2}{3}$=$1272.33, face of the note drawn Aug. 1 for 60 da. without interest.

Art. 739.

2. Account sales of grain sold on account of J. Berry, of Chicago.

Date.	Quantity, etc.	Price.		Amount.
June 1,	350 bu. wheat	$1.35,	60 da.	$472.50
" 15,	275 " "	1.75,	90 "	481.25
July 3,	1260 " corn	.79,	6 mo.	995.40
" 10,	375 " Rye	1.02,	3 "	382.50
			Sales,	$2331.65

Charges.

May 28,	Freight	$567.50	
" 30,	Cartage	22.50	
June 5,	Insurance	56.25	
Oct. 26,	Com. and guaranty 5% .	116.58	$762.83
	Net proceeds,		$1568.82

Average of sales (Art. **734**) Oct. 26, hence the commission bears this date.

Equated time of paying balance (Art. **738**) is 62 da. from Oct. 26 or Dec. 27, *Ans.*

3. Account sales of sugar and tea sold on acct. of Brown, Sampson & Co.

Oct. 1, 1874, 13 hhd., each 1520 lb. @ $.12½ on 6 mo. $2470

" 5, " 15 chests tea each 95 lb. @ 1.05 " 1496.25

Charges.

Oct. 3, 1874,	Insurance	$85	
" 10, "	Cooperage, etc., . .	24.50	
" 20, "	Cartage, ...	125	
Apr. 3, 1875,	Com. and guar. @ 4½%	178.48	412.98
	Net proceeds,		$3553.27

Average of sales (Art. **734**) Apr. 3, 1875, hence date of commission, etc.

Equated time of paying balance (Art. **738**) is 11 da. after Apr. 3, or Apr. 14, 1875, *Ans.*

Art. 767.

2. 4 horses : 20 horses :: 12 bu. : x; $x=60$ bu., *Ans.*

3. 96 c. : 40 c. :: \$240 : x; $x=\$100$, *Ans.*

4. 20 lb. : 45 lb. :: \$1.80 : x; $x=\$4.05$, *Ans.*

5. 18 bu. : 200 bu. :: 4 bbl. : x; $x=44\frac{4}{9}$ bbl., *Ans.*

Art. 770.

3. 5 horses : x :: 10 T. : 18 T.; $x=9$ horses, *Ans.*

4. 8 yd. : x :: \$6 : \$75 ; $x=100$ yd., *Ans.*

5. x : 5 men :: 32 rd. : 10 rd.; $x=16$ men, *Ans.*

6. 5 sh. : x :: \$20.75 : \$398.40 ; $x=96$ sheep, *Ans.*

7. 10 bbl. : 476 bbl. :: \$112.50 : x; $x=\$5355$, *Ans.*

8. 30 min. : 260 min. :: 50 min. : x; $x=433\frac{1}{3}$ min.= 7 hr. 13 min. 20 sec., *Ans.*

9. x : 8 bu. :: \$454.40 : \$10.24 ; $x=355$ bu., *Ans.*

10. 12 mi. : x :: 1.6 hr. : 15 hr.; $x=112\frac{1}{2}$ miles, *Ans.*

11. x : $7\frac{1}{2}$ da. :: 95 men : 12 men ; $x=59\frac{3}{8}$ da., *Ans.*

12. $\frac{3}{8}$ A. : $45\frac{3}{4}$ A. :: 60 : x ; $\$60\times45\frac{3}{4}\div\frac{3}{8}=\$7320$, *Ans.*

13. 72 yd. : x :: £44.8 : £5.6 ; $x=9$ yd., *Ans.*

14. $\frac{7}{8}$ bbl. : $\frac{5}{6}$ bbl. :: $\$1\frac{9}{16}$: x ; $\$\frac{25}{16}\times\frac{5}{6}\div\frac{7}{8}=\$1\frac{41}{84}$, *Ans.*

15. $35\frac{9}{16}$ A. : x :: \$284.50 : \$374.70 ; $x=46$ A. 134 P.

16. 1.75 yd. : 87.5 yd. :: \$1.26 : x ; $x=\$63$, *Ans.*

17. \$456.25 : \$1000 :: \$5000 : x ; $x=\$10958.90$, *Ans.*

18. 2240 lb. : 2000 lb. :: \$4.48 : x ; $x=\$4$, cost ;
\$7.25—\$4=\$3.25, gain, *Ans.*

19. $18 \times 4 \times 6 : 80 \times 4 \times 4 :: \$30.24 : x$; $x \times \$89.60$, *Ans.*

20. $\$53.50 - \$44.50 = \$9.$ gain on 36 bu.;
36 bu. : 480 bu. :: \$9 : x; $x = \$120$, *Ans.*

21. \$700 : \$1050 :: $1\frac{2}{3}$ yr. : x; $x = 2\frac{1}{2}$ yr., *Ans.*

Note.—In solution of statements all terms are to be treated as abstract numbers.

Art. 772.

2. $$\left.\begin{array}{rl} 20 \text{ hr.} & : 12 \text{ hr.} \\ 9 \text{ min.} & : 18 \text{ min.} \end{array}\right\} :: 36 \text{ T.} : x;\ x = 43\tfrac{1}{5} \text{ tons, } \textit{Ans.}$$

3. $$\left.\begin{array}{ll} 4 \text{ persons} & : 15 \text{ persons} \\ 8 \text{ wk.} & : x \end{array}\right\} :: \$320 : \$800;\ x = 5\tfrac{1}{3} \text{ wk.}$$

4. $$\left.\begin{array}{ll} 6 \text{ da.} & : 18 \text{ da.} \\ 8 \text{ hr.} & : \ \ 6 \text{ hr.} \end{array}\right\} :: 192 \text{ mi.} : x;\ x = 432 \text{ mi., } \textit{Ans.}$$

5. $$\left.\begin{array}{rl} 6 \text{ lab.} & : 20 \text{ lab.} \\ 10 \text{ da.} & : x \end{array}\right\} :: 34 \text{ yd.} : 170 \text{ yd.};\ x = 15 \text{ da., } \textit{Ans.}$$

Art. 774.

2. $$\left.\begin{array}{rr} 5 \text{ ft.} : & 8 \text{ ft.} \\ 75 \text{ ft.} : & 566 \text{ ft.} \end{array}\right\} :: \$41.25 : x;\ x = \$498.08, \textit{ Ans.}$$

4. $$\left.\begin{array}{rr} 4 \text{ hr.} : & 20 \text{ hr.} \\ 12 \text{ da.} : & 56 \text{ da.} \end{array}\right\} :: 48 \text{ bu.} : x;\ x = 1120 \text{ bu., } \textit{Ans.}$$

5. $$\left.\begin{array}{ll} \$800 & : x \\ 15 \text{ mo.} & : 8 \text{ mo.} \end{array}\right\} :: \$70 : \$300;\ x = \$6428.57, \textit{ Ans.}$$

6. $$\left.\begin{array}{rcr} 800 \text{ cop.} & : & 3000 \text{ cop.} \\ 230 \text{ pp.} & : & 400 \text{ pp.} \\ 40 \text{ lin.} & : & 35 \text{ lin.} \end{array}\right\} :: 20 \text{ rm.} : x;\ x = 114\tfrac{3}{23} \text{ rm.}$$

7. $$\left.\begin{array}{l}\text{10 men} : \text{40 men}\\ \text{18 da.} : \text{24 da.}\\ \text{10 hr.} : \text{9 hr.}\end{array}\right\} :: \text{46 Cd.} : x;\ x = 220\tfrac{4}{5}\text{ Cd., } \textit{Ans.}$$

8. $$\left.\begin{array}{l}2\tfrac{1}{2}\text{ yd.} : 36\tfrac{1}{2}\text{ yd.}\\ 1\tfrac{2}{5}\text{ yd.} : 1\tfrac{1}{2}\text{ yd.}\end{array}\right\} :: \$3.375 : x;\ x = \$52.79,\ \textit{Ans.}$$

9. $$\left.\begin{array}{l}\text{45 men} : x\\ \text{3 mo.} : 2\tfrac{1}{2}\text{ mo.}\end{array}\right\} :: 1\ (\text{the work}) : 1;\ x = 54\text{ men.}$$

54 men—45 men=9 men, *Ans.*

10. $$\left.\begin{array}{l}\text{16 ft.} : 17\tfrac{1}{2}\text{ ft.}\\ \text{7 ft.} : 10\tfrac{1}{2}\text{ ft.}\\ \text{15 ft.} : \text{13 ft.}\end{array}\right\} :: \text{384 bbl.} : x;\ x = 546\text{ bbl., } \textit{Ans.}$$

11. $$\left.\begin{array}{l}\text{10 ft.} : \text{8 ft.}\\ \text{5 ft.} : \text{4 ft.}\\ \text{16 in.} : \text{10 in.}\end{array}\right\} :: \text{5200 lb.} : x;\ x = 2080\text{ lb., } \textit{Ans.}$$

12. $$\left.\begin{array}{l}\text{20 T.} : \text{400 T.}\\ 1\tfrac{1}{2}\text{ mi.} : \tfrac{1}{2}\text{ mi.}\end{array}\right\} :: \$15 : x;\ x = \$100,\ \textit{Ans.}$$

13. $$\left.\begin{array}{l}\text{200 ft.} : \text{600 ft.}\\ \text{20 ft.} : \text{24 ft.}\\ \text{16 in.} : \text{240 in.}\end{array}\right\} :: \left\{\begin{array}{l}\text{13500 br.} : x\\ \text{8 in.} : \text{10 in.}\\ \text{4 in.} : \text{5 in.}\\ \text{2 in.} : 3\tfrac{1}{2}\text{ in.}\end{array}\right.$$

$x=266605\tfrac{5}{7}$ bricks, *Ans.*

14. 28.5 gal. : 63 gal. × 15 :: \$7.125 : x; $x=\$236.25$.

15. 6.25d. : 2480d. :: 1.75 yd. : x; $x=694.4$ yd., *Ans.*

16. $$\left.\begin{array}{l}\$750 : x\\ \text{4.5 yr.} : \text{1.5 yr.}\end{array}\right\} :: \$202.50 : \$155.52;\ x = \$1728.$$

17. $$\left.\begin{array}{l}\text{15 men} : \text{60 men}\\ \text{20 da.} : x\end{array}\right\} :: 1 : 1;\ x = 5\text{ da., } \textit{Ans.}$$

Or, 60 men : 15 men :: 20 da. : x.

18. $1.75 \text{ lb.} : 70 \text{ lb.} :: \left\{\begin{array}{l} 2\frac{1}{2} \text{ yd.} : x \\ 6 \text{ qr.} : 4 \text{ qr.} \end{array}\right. ; x = 150 \text{ yd.}$, *Ans.*

19. $\left.\begin{array}{l} \$300 : \$210 \\ 1\frac{2}{3} \text{ yr.} : x \end{array}\right\} :: \$30 : \$42.891 ; x = 3.4 \text{ yr.}$ *Ans.*

20. $\$18 : \$21 :: \$10 : x ; x = \$11\frac{2}{3}$, *Ans.*

21.

$$\left.\begin{array}{l} 6 \text{ men} : x \\ 3 \text{ da.} : 12 \text{ da.} \\ 10.25 \text{ hr.} : 8.2 \text{ hr.} \end{array}\right\} :: \left\{\begin{array}{l} 22.5 \text{ ft.} : 45 \text{ ft.} \\ 17.3 \text{ ft.} : 34.6 \text{ ft.} \\ 10.25 \text{ ft.} : 12.3 \text{ ft.}; \end{array}\right.$$

$x = 9$ men, *Ans.*

22. $\left.\begin{array}{l} 8 \text{ ft.} : 18 \text{ ft.} \\ 4\frac{1}{5} \text{ ft.} : 3\frac{5}{6} \text{ ft.} \\ 2\frac{1}{2} \text{ ft.} : x \end{array}\right\} :: 67.5 \text{ bu.} : 450 \text{ bu.} ; x = 8.116 \text{ ft.}$

23. $\left.\begin{array}{l} 10 \text{ lb.} : 16 \text{ lb.} \\ 5 \text{ lb.} : 120 \text{ lb.} \end{array}\right\} :: \$1.25 : x ; x = \$48$, *Ans.*

24. $\$48.75 : \$43.125 :: \$60 : x ; x = \$53.08$, *Ans.*

25.

$$\left.\begin{array}{l} 6 \text{ men} : 10 \text{ men} \\ 4 \text{ mo.} : x \\ 26 \text{ da.} : 24 \text{ da.} \\ 12 \text{ hr.} : 10 \text{ hr.} \end{array}\right\} :: \left\{\begin{array}{l} 24 \text{ bk.} : 10 \text{ bk.} \\ 300 \text{ pp.} : 240 \text{ pp.} \\ 60 \text{ li.} : 52 \text{ li.} \\ 12 \text{ wd.} : 16 \text{ wd.} \\ 6 \text{ let.} : 8 \text{ let.} \end{array}\right.$$

$x = 1.6 \text{ mo.} = 1 \text{ mo. } 14.4 +$ da., *Ans.*

NOTE.—A month equals 24 days.

Art. 782.

3. $\$4000 + \$2700 + \$2300 = \$9000.$

$$\left.\begin{array}{llllll} \text{A's share of rent} & = & \frac{4}{9} & \text{of } \$720 & = & \$320 \\ \text{B's} \quad \text{“} \quad \text{“} & = & \frac{3}{10} & \text{“} & = & 216 \\ \text{C's} \quad \text{“} \quad \text{“} & = & \frac{23}{90} & \text{“} & = & 184 \end{array}\right\} \textit{Ans.}$$

4. \$7.50 × 230.4 = \$1728 whole rent.
Whole number of sheep 1640.

$$\left.\begin{array}{llll}\text{A will pay} & \frac{288}{1640} \text{ of } \$1728 & = & \$303.47\\ \text{B} \quad `` & \frac{320}{1640} \quad `` & = & \$337.17\\ \text{C} \quad `` & \frac{384}{1640} \quad `` & = & \$404.60\\ \text{D} \quad `` & \frac{648}{1640} \quad `` & = & \$682.76\end{array}\right\}\textit{Ans.}$$

5. \$22000 — \$8800 = \$13200, net liabilities.

A will receive \$4275 — ($\frac{4275}{22000}$ of \$13200) = \$1710, *Ans.*
B “ \$2175.50 — ($\frac{21755}{220000}$ of \$13200) = \$870.20.

6. The entire gain is \$7500, which is $33\frac{1}{3}$% of the entire capital.

$$\left.\begin{array}{ll}\$2000 \div .33\tfrac{1}{3} = \$6000, & \text{A's capital.}\\ 2800.75 \div .33\tfrac{1}{3} = \$8402.25, & \text{B's} \quad ``\\ 1685.25 \div .33\tfrac{1}{3} = \$5055.75, & \text{C's} \quad ``\\ 1014 \div .33\tfrac{1}{3} = \$3042, & \text{D's} \quad ``\end{array}\right\}\textit{Ans.}$$

7. One will receive \$9 as often as the other receives \$8.

$$\left.\begin{array}{l}\frac{9}{17} \text{ of } \$10927.60 = \$5785.20\\ \frac{8}{17} \quad `` \quad = \$5142.40\end{array}\right\}\textit{Ans.}$$

8. Of every \$30, C puts in \$14, or $\frac{14}{30}$ of capital.
$\frac{7}{15}$ of \$37680 = \$17584, C's cap., also entire gain.

$$\left.\begin{array}{ll}\frac{6}{30} \text{ of } \$17584 = \$3516.80, & \text{A's gain.}\\ \frac{10}{30} \quad `` \quad = \$5861.33\tfrac{1}{3}, & \text{B's} \quad ``\\ \frac{14}{30} \quad `` \quad = \$8205.86\tfrac{2}{3}, & \text{C's} \quad ``\end{array}\right\}\textit{Ans.}$$

9.

Resources.		Liabilities.	
$24843.75	Bills Rec.	$14058.75	Bills Pay.
$42375.80	Cash.	$12375.80	Account.
$26500.00	Account.		
$175840.00	Mdse.		
$269559.55		$26434.55	
26434.55			
$243125.00	Net capital.		
125000.00	Investment.		
$118125.00	Net gain.		

$$\left.\begin{array}{llll}\frac{60}{125} \text{ of } \$118125 & = \$56700 & \text{Ames' share of gain.} \\ \frac{50}{125} \quad `` & = \$37800 & \text{Lyon's} \quad `` \quad `` \\ \frac{25}{125} \quad `` & = \$23625 & \text{Clark's} \quad `` \quad `` \end{array}\right\} \textit{Ans.}$$

Art. 783.

2.

$$\begin{array}{rl} \$12000 \times 6 & = \$72000 \\ 10000 \times 8 & = 80000 \\ 8000 \times 11 & = \underline{88000} \\ & \$240000 \end{array}$$

$$\left.\begin{array}{lll}\frac{72}{240} \text{ of } \$8000 & = \$2400 & \text{Barr's gain.} \\ \frac{80}{240} \quad `` & = \$2666\frac{2}{3} & \text{Banks'} \quad `` \\ \frac{88}{240} \quad `` & = \$2933\frac{1}{3} & \text{Butts'} \quad `` \end{array}\right\} \textit{Ans.}$$

3.

$$\begin{array}{rl} \$1300 \times 12 & = \$15600 \\ 1000 \times 10 & = 10000 \\ 900 \times 5 & = \underline{4500} \\ & \$30100 \end{array}$$

$$\left.\begin{array}{lll}\frac{156}{301} \text{ of } \$750 & = \$388.70 & \text{A's gain.} \\ \frac{100}{301} \quad `` & = \$249.17 & \text{B's} \quad `` \\ \frac{45}{301} \quad `` & = \$112.13 & \text{C's} \quad `` \end{array}\right\} \textit{Ans.}$$

4.

$$\left\{\begin{array}{rcrr} \$2000\times10 &=& \$20000 & \\ 1600\times\ 4 &=& 6400 & \\ 2000\times10 &=& \underline{20000} & \underline{\$46400} \end{array}\right.$$

$$\left\{\begin{array}{rcrr} \$3000\times\ 4 &=& \$12000 & \\ 3500\times12 &=& 42000 & \\ 2000\times\ 8 &=& \underline{16000} & \underline{\$70000} \\ & & & \$116400 \end{array}\right.$$

$$\left.\begin{array}{l} \frac{464}{1164} \text{ of } \$3372 = \$1344.16 = \text{A's gain.} \\ \frac{700}{1164} \quad \text{“} \quad = \$2027.84 = \text{B's} \quad \text{“} \end{array}\right\} \textit{Ans.}$$

5.

$$\begin{array}{rcrl} \$2700\times\ 9 &=& \$24300\,; & \frac{2430}{4374} \text{ of } \$5400 = \$3000 \text{ A's gain.} \\ \$2160\times\ 6 &=& 12960\,; & \frac{1296}{4374} \quad \text{“} \quad = \$1600 \text{ B's} \quad \text{“} \\ \$540\times12 &=& \underline{6480}\,; & \frac{648}{4374} \quad \text{“} \quad = \$800 \text{ C's} \quad \text{“} \\ & & \$43740 & \end{array}$$

$$\left.\begin{array}{l} \$2700+\$3000=\$5700=\text{A's share of stock.} \\ \ 2160+\ 1600=\ 3760=\text{B's} \quad \text{“} \quad \text{“} \\ \ \ 540+\ \ 800=\ 1340=\text{C's} \quad \text{“} \quad \text{“} \end{array}\right\} \textit{Ans.}$$

6.

$$\left\{\begin{array}{rcrr} \$2000\times4 &=& \$8000 & \\ 3000\times5 &=& 15000 & \\ 2400\times3 &=& \underline{7200} & \underline{\$30200} \end{array}\right.$$

$$\left\{\begin{array}{rcrr} \$5000\times6 &=& \$30000 & \\ 6200\times5 &=& 31000 & \\ 8200\times1 &=& \underline{8200} & \underline{\$69200} \end{array}\right.$$

$$\left\{\begin{array}{rcrr} \$6000\times4 &=& \$24000 & \\ 2000\times4 &=& 8000 & \\ 1000\times4 &=& \underline{4000} & \underline{\$36000} \\ & & & \$135400 \end{array}\right.$$

$$\left.\begin{array}{l} \frac{302}{1354} \text{ of } \$7570 = \$1688.44 \text{ Crane's gain.} \\ \frac{692}{1354} \quad \text{“} \quad = \$3868.86 \text{ Child's} \quad \text{“} \\ \frac{360}{1354} \quad \text{“} \quad = \$2012.70 \text{ Coe's} \quad \text{“} \end{array}\right\} \textit{Ans.}$$

Art. 787.

2.
$$\begin{array}{rrl} \$.08\times 20 = & \$1.60 & \quad \$.10\times 76=\$7.60. \\ .09\times 24 = & 2.16 & \quad \$7.60-\$7.28=\$.32,\ \textit{Ans.} \\ .11\times 32 = & \underline{3.52} & \\ & \$7.28 & \end{array}$$

3.
$$\begin{array}{rrl} \$1.44\times 18 = & \$25.92 & \\ 1.32\times 6 = & 7.92 & \\ 1.08\times 6 = & 6.48 & \\ .84\times \underline{12} = & \underline{10.08} & \\ 42\ \ ) & \underline{\$50.40} & \\ & \$1.20\ ; & \$1.50-\$1.20=\$.30,\ \textit{Ans.} \end{array}$$

4.
$$\begin{array}{rrl} \$.07\times 25\times 24 = & \$42 & \quad 600 \text{ lb.}+400 \text{ lb.}+200 \text{ lb.}= \\ .10\times 40\times 10 = & 40 & \quad 1200 \text{ lb.} \\ .13\times 50\times 4 = & \underline{26} & \quad \$.095\times 1200=\$114. \\ & \$108 & \quad \$114-\$108=\$6 \text{ gain},\ \textit{Ans.} \end{array}$$

5.
$$\begin{array}{rrl} \$5.00\times 84 = & \$420 & \\ 4.75\times 96 = & 456 & \\ 5.50\times \underline{130} = & \underline{715} & \\ 310 & \$1591 & \times 1.20\div 310=\$6.16,\ \textit{Ans.} \end{array}$$

Art. 788.

3.
$$\begin{array}{ll} & \begin{array}{r|c|c|c|c|c} & (1) & (2) & (3) & (4) & \\ \end{array} \\ 12 & \left\{\begin{array}{r|c|c|c|c|c} 10 & \frac{1}{2} & & 1 & & 1 \\ 11 & & 1 & & 2 & 2 \\ 14 & \frac{1}{2} & \frac{1}{2} & 1 & 1 & 2 \end{array}\right. \end{array}$$

Or by multiplying (1) by 4 and (2) by 2, we get 2, 2, 3 respectively. As many different answers may be obtained as different multipliers are used.

4.

		(1)	(2)	(3)	(4)	(5)	(6)	
$5\frac{1}{2}$	4	$\frac{2}{3}$		2		2	1	
	5		2		10	10	5	
	6	2		6		6	3	
	8		$\frac{2}{5}$		2	2	1	etc., etc., *Ans.*

5.

		(1)	(2)	(3)	(4)	(5)		
$6\frac{1}{4}$	$5\frac{1}{2}$	$\frac{4}{3}$		12		3	3 bbl. @ $\$5\frac{1}{2}$.	*Ans.*
	6		4		12	3	3 " " $6.	
	$7\frac{3}{4}$	$\frac{2}{3}$	$\frac{2}{3}$	6	2	2	2 " " $\$7\frac{3}{4}$.	

(1) × 9 gives (3) ; (2) × 3 = (4) ; $\overline{(4)+(3)} \div 4$ gives (5).

6.

150	120	$\frac{1}{30}$		3		3	3 gal. @ $1.20.
	180	$\frac{1}{30}$		3		3	3 " " $1.80.
	230		$\frac{1}{80}$		15	15	15 " " $2.30.
	0		$\frac{1}{150}$		8	8	8 " water, *Ans.*

Art. 789.

2.

44	40	$\frac{1}{4}$			1			1	10	
	32		$\frac{1}{12}$			1		1	10	10 cows @ $40.
	36			$\frac{1}{8}$			1	1	10	10 " " $36.
	48	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	1	3	2	6	60	60 " " $48.

3.

160	80	$\frac{1}{80}$			1			1	10	10 lb. @ $.80.
	120		$\frac{1}{40}$			1		1	10	10 " " $1.20.
	150			$\frac{1}{10}$			2	2	20	
	180	$\frac{1}{20}$	$\frac{1}{20}$	$\frac{1}{20}$	4	2	1	7	70	70 " " $1.80.

4.

240	250	$\frac{1}{10}$		9		9	12	
	350		$\frac{1}{110}$		9	9	12	12 yd. @ $3.50.
	150	$\frac{1}{90}$	$\frac{1}{90}$	1	11	12	16	16 " " $1.50.

Art. 790.

2.

$$6\left\{\begin{array}{r|c|c|c|c|r|r|}10 & \frac{1}{4} & \frac{1}{4} & 1 & 5 & 6 & 30\\ 2 & \frac{1}{4} & & 1 & & 1 & 5\\ 1 & & \frac{1}{5} & & 4 & 4 & 20\\ \cline{6-7} & & & & & 11 & 55\end{array}\right.$$

$$\left.\begin{array}{r}\text{30 men.}\\ \text{5 women.}\\ \text{20 boys.}\end{array}\right\}\textit{Ans.}$$

3.

$$60\left\{\begin{array}{r|c|c|r|}90 & \frac{1}{30} & 2 & 66\frac{2}{3}\\ 0 & \frac{1}{60} & 1 & 33\frac{1}{3}\\ \cline{3-4} & & 3 & 100\end{array}\right.$$

33½ gal. water, *Ans.*

4.

$$150\left\{\begin{array}{r|c|c|c|c|r|r|}300 & \frac{1}{150} & & 4 & & 4 & 16\\ 50 & \frac{1}{100} & & 6 & & 6 & 24\\ 75 & & \frac{1}{75} & & 1 & 1 & 4\\ 175 & & \frac{1}{25} & & 3 & 3 & 12\\ \cline{6-7} & & & & & 14 & 56\end{array}\right.$$

man labored 16 da.
boy " 24 da.
" " 4 da.
" " 12 da.

Art. 792.

1. If the difference is $\frac{1}{3}$ of the greater number,
the less must be $\frac{2}{3}$ of the greater.
Hence the greater is $\frac{3}{5}$ of 120, or 72,
and the less is $\frac{2}{5}$ of 120, or 48, *Ans.*

2. For proportionals, represent D's age by 1
E's " 1½
F's " 5¼

$$\begin{array}{r}1\\ 1\frac{1}{2}\\ 5\frac{1}{4}\\ \hline 7\frac{3}{4}\end{array}$$

$$\left.\begin{array}{l}7\frac{3}{4} : 124 :: 1 : \text{D's age; D's age} = 16\text{ yr.}\\ \text{" " } 1\frac{1}{2} : \text{E's " ; E's "} = 24\text{ yr.}\\ \text{" " } 5\frac{1}{4} : \text{F's " ; F's "} = 84\text{ yr.}\end{array}\right\}\textit{Ans.}$$

3. 7 bu. wheat = 10 bu. rye.
5 " rye = 14 " oats.
6 " oats = \$6.
\$60 = x bu. wheat ; $x=15$ bu., *Ans.*

4. \$5 × 20 − \$86 = \$14, loss by being idle.
\$14 ÷ \$7 = 2, No. of days idle.
20 da. − 2 da. = 18 da., *Ans.*

5. First man in 1 hr. will build $\frac{1}{180}$ of the fence.
Second " " " $\frac{1}{72}$ "
Both men " " $\frac{7}{360}$ "
" 6 hr. " $\frac{7}{60}$ "
$1 \div \frac{7}{60} = 8\frac{4}{7}$, No. da. of 6 hr. each, *Ans.*

6. Comparing first condition with one-half the numbers in the second condition,
we find 2 boxes soap cost \$6.
Hence, 1 " " \$3, *Ans.*

Then, from the first condition,
6 boxes starch cost \$12.
1 " " \$2, *Ans.*

7. First man 1 da. + second man 1 da. do $\frac{1}{16}$ of the work.
Second " + third " $\frac{3}{40}$ "
First " + third " $\frac{7}{80}$ "
The three men working 2 da. each do $\frac{18}{80}$ "
" " " 1 " $\frac{9}{80}$ "
$1 \div \frac{9}{80} = 8\frac{8}{9}$; the number of days all will do the work.
$\frac{9}{80} - \frac{1}{16} = \frac{1}{20} =$ part the third man can do in 1 da.
$\frac{9}{80} - \frac{3}{40} = \frac{3}{80} =$ " first " "
$\frac{9}{80} - \frac{7}{80} = \frac{1}{40} =$ " second " "

Hence the first man can do the work in $26\frac{2}{3}$ da.
" second " " " 40 "
" third " " " 20 "

$\frac{3}{80}$, $\frac{1}{40}$, and $\frac{1}{20}$ are to one another as 3, 2, and 4.

$\frac{3}{9}$ of \$540 = \$180, first man's share.
$\frac{2}{9}$ " = \$120, second "
$\frac{4}{9}$ " = \$240, third "
} *Ans.*

8. Had he paid \$10 per bbl. for all, he would have paid \$200. The difference \$18 was caused by saving \$3 per bbl. on the second quality.

\$18 ÷ \$3 = 6, No. of bbl. @ \$7.
20 − 6 = 14, " " \$10, *Ans.*

9. The minute-hand gains on the hour-hand 11 revolutions in 12 hours. To come together the third time after 12 M., or to gain 3 revolutions,

rev. rev. hr.
$11 : 3 :: 12 : x$; x=3 hr. 16 m. $21\frac{9}{11}$ sec.; or
16 m. $21\frac{9}{11}$ sec. past 3 P. M., *Ans.*

10. Taking $\frac{3}{5}$ of the numbers given in the first condition,
9 bu. wheat + 18 bu. oats = \$21.
Second condition, 9 bu. wheat + 6 bu. oats = \$15.
The difference \$6 must be the cost of 12 bu. oats.
Hence, oats cost \$.50, and wheat \$$1.33\frac{1}{3}$ per bu., *Ans.*

11. 3 da. Ames = $4\frac{1}{2}$ da. Jones.
9 " Jones = 12 " Smith.
10 " Smith = 8 " Ray.
x " Ray = 5 " Ames; x=8 da., *Ans.*

12. \$4.375 × 25 × 40 ÷ 1.045 = \$4186.60, net cash cost.
\$4.625 × 25 × 40 ÷ 1.02 = \$4534.31, " receipts.
\$4534.31 − \$4186.60 = \$347.71, net gain, Ans.

13. If 10 bushels are added to the smaller bin, there will be 80 bushels in both; but as the larger will then contain $\frac{5}{3}$ as many bushels as the smaller, the two together will contain $\frac{8}{3}$ times the number in the smaller;

hence, the smaller contains $\frac{3}{8}$ of 80 bu. less 10 bu. = 20 bu.
the greater " $\frac{5}{8}$ " = 50 bu.
70 bu.

14. A, B, and C can perform $\frac{1}{12}$ of the work in 1 hr.

A and B	"	$\frac{1}{16}$	"	"
A and C	"	$\frac{1}{18}$	"	"
C	"	$\frac{1}{12}-\frac{1}{16}=\frac{1}{48}$	"	"
B	"	$\frac{1}{12}-\frac{1}{18}=\frac{1}{36}$	"	"
B and C	"	$\frac{1}{48}+\frac{1}{36}=\frac{7}{144}$	"	"
"	"	$\frac{7}{144}\times 9\frac{1}{7}=\frac{4}{9}$	"	$9\frac{1}{7}$, *Ans.*

15. After deducting for bad debts and credit, there must still remain cost + $\overline{.125 + .04}$ of cost, or 1.165 of cost. 1.165 ÷ .965 = 1.20725 per cent. of cost whose present worth is equal to 1.16½% of cost. If 5% has been lost for bad debts, 1.20725 must be .95 of selling price.

1.20725 ÷ .95 = 1.27+, % of cost to equal selling price, an advance of 27%, *Ans.*

16. Taking the younger brother's share as the standard.
Young. Bro. = 1 ; $\frac{1}{3}$ of youn. bro. = $\frac{1}{3}$
Eld. " = $1\frac{1}{2}$; $\frac{1}{2}$ of eld. " = $\frac{3}{4}$; $\frac{1}{3}+\frac{3}{4}=1\frac{1}{12}$.
Amt. on int. = $1\frac{1}{12}$ of younger brother's share.
$2400 ÷ 5 ÷ .06 = $8000 = amt. on int.
$8000 ÷ $1\frac{1}{12}$ = 7384\frac{8}{13}$ young. brother's share.
7384\frac{8}{13}$ × $1\frac{1}{2}$ = 11076\frac{12}{13}$ eld. " " *Ans.*

17. Height of church $=\frac{3}{4}$ height of steeple $+ 12$ ft.
Entire height $=\frac{7}{4}$ " " "

If $\frac{7}{4}$ height of steeple $+ 12$ ft. $= 268$ ft., $\frac{7}{4}$ height of steeple $= 256$ ft.

$256 \div \frac{7}{4} = 146\frac{2}{7}$ ft., height of steeple in feet.

18. B spends yearly \$100 more than his income.
A spends \$300 less than B, hence saves \$200 per yr.
$\$200 \times 4 = \$800$, *Ans.*

19. If the third has $\frac{1}{2}$ as much as the other two, he must have $\frac{1}{3}$ of the whole, or \$840.

If the second has $\frac{3}{4}$ as much as the first, together they have $\frac{7}{4}$ as much as the first.

$\$2520 - \$840 \div \frac{7}{4} = \$960$; $\$960 \times \frac{3}{4} = \$720$.

Hence, they have respectively \$960, \$720, \$840, *Ans.*

20. 4 debts due in 4, 9, 12 and 20 mo. respectively may be paid in $11\frac{1}{4}$ mo.

The amt. of \$1 at 5% for $11\frac{1}{4}$ mo. is $\$1.04\frac{11}{16}$.

Formula—*Present Worth* × *Amt. of* \$1 = *Face.*

$\$1500 \times 1.04\frac{11}{16} = \$1570.31$, *Ans.*

21. 6 lb. + 4 lb. = 10 lb. If an addition of 10 lb. gives 1 lb. more to each family, there must be 10 families.

50 lb. × 10 + 6 lb. = 506 lb., *Ans.*

22.

$$\begin{array}{llrcrcr} \text{Jan.} & 1, 1875 & \$400 & \times & 0 & = & 0 \\ \text{Sept.} & 1, \text{ "} & 700 & \times & 243 & = & 170100 \\ \text{Apr.} & 1, 1876 & \underline{1000} & \times & 456 & = & \underline{456000} \\ & & 2100 & \times & x & = & 626100 ;\ x = 298. \end{array}$$

Jan. 1, 1875 + 298 da. = Oct. 26, 1875, *Ans.*

23. Pres. worth of $1 due in		2 yr.,		$.87719
"	"	4	"	.78125
"	"	8	"	.64102
"	"	10	"	.58824
				2.88770

2.8870 : .87719 :: 123251.82 : eldest's share=$37440
" : .78125 :: " : second son's " =$33345
" : .64102 :: " : third " " =$27360
" : .58824 :: " : youngest " " =$25106.82

24. $1.20 × 1.20 ÷ .90 = $1.60, *Ans.*

25.
$$104 \left\{ \begin{array}{r|c|c|r|l} 75 & \frac{1}{25} & 21 & 42 & \text{; No. of geese.} \\ 125 & \frac{1}{21} & 29 & 58 & \text{; " turkeys, } \textit{Ans.} \\ \hline & & 50 & 100 & \end{array} \right.$$

26. A received $\frac{1}{3}$ estate—$180.
B " $\frac{1}{4}$ "
A+B " $\frac{7}{12}$ " —$180.
C " $\frac{5}{12}$ " +$180, or the balance.
A's+B's—C's=$\frac{2}{12}$ " —$360=$590.
Hence $\frac{1}{6}$ est.=$950; whole est. $950 × 6=$5700, *Ans.*

27. $1920 × .147=$282.24, Sim. int.
$1920+$282.24=$2202.24, Amt.
$1920 × 1.1236 × 1.027=2215.56, Amt. at comp. int.
$2215.56—$1920=$295.56, Comp. int.
$1920÷1.147=$1673.93, Present worth.
$1920—$1673.93=$246.07, True discount.
$1920 × .1475=$283.20, Bank discount.
$1920—.283.20=$1636.80, Proceeds.
$1920÷.8525=$2252.20, Face of note.

NOTE.—The conditions in the above are in no wise dependent *one upon another.*

28. Their shares are as 1, $1\frac{1}{2}$, $2\frac{1}{4}$; $1+1\frac{1}{2}+2\frac{1}{4}=4\frac{3}{4}$.

$$\left.\begin{array}{l} 4\frac{3}{4} : 1500 :: 1 \ \ : x;\ x=\$315.79 \\ 4\frac{3}{4} : 1500 :: 1\frac{1}{2} : x;\ x=\$473.69 \\ 4\frac{3}{4} : 1500 :: 2\frac{1}{4} : x;\ x=\$710.52 \end{array}\right\} \textit{Ans.}$$

29. March 1, 500
June 1, 800
Aug. 1, 600, Equated time, May 27.

1000 paid Apr. 1, 56 da. before it is due, will allow the keeping of the balance $900, 62 da. after it is due.

May 27+62 da.=July 28. $900, July 28, *Ans.*

30. $10283.56÷$10640 = .9665 cost of exchange.
Int. for 63 da. = .01225
$.97875 course of " *Ans.*

31. As often as he invests $1 in 5-20's he invests $2 in 5's of '81.

$\$1\div 1.07\frac{3}{4}\times .06=\$\frac{24}{431}$=income from $1 in 5-20's.
$\$2\div .98\frac{3}{4}\times .05=\$\frac{8}{79}$ = " $2 " 5's of '81.
$\$\frac{24}{431}+\$\frac{8}{79}=\$\frac{5344}{34049}$, income from $3 invested.
$\$1674\div\frac{5344}{34049}=\$10665.80$=amt. invested in 5-20's.
$\$10665.80\times 2=\$21331.60$ = " 5's of '81.

32.	45	$\frac{1}{3}$	$\frac{1}{3}$	1	2	3	3600	No. of bu. A furnishes.
48	51	$\frac{1}{3}$		1		1	1200	" B "
	54		$\frac{1}{6}$		1	1	1200	" C "
						5	6000	

33. $\$4.50\times 42.5=\$192.375$, cost @$4.50 per U. S. gal.
$231\times 42.5\div 277.274=35.6119$, No. Imp. gal.
£1.1 × 35.6119=£39.17309.
$\$4.8665\times 39.17309=\$190.635$, cost @ £1.25 per Imp. gal. $\$192.375-\$190.635=\$1.74$, *Ans.*

34. $300\text{ ft.} - \overline{20\text{ ft.} \times 2} = 260$ ft., width of garden remaining.

Walk 40 ft. wide : garden 260 ft. wide :: 2 : 13 ; $\frac{2}{13}$, *Ans.*

35. June 3,	200 bbl.	@	$6.25	=	$1250
" 30,	350 "	"	6.50	=	2275
July 29,	400 "	"	6.12½	=	2450
Aug. 6,	50 "	"	6.00	=	300
	Total amt. of sales,				$6275

Average date of above sales (Art. **739**), June 3 + 35 da., July 8.

Storage	200 bbl.	5 wk.	@	$.02	=	$20
"	350 "	9 "	"	"	=	63
"	400 "	13 "	"	"	=	104
"	50 "	14 "	"	"	=	14
Storage due day of last sale, Aug. 6,						$201

Commission on $6275 @ 3½%=$219.63. Due July 8.

Charges paid May 1, $240.10.

Duc.	Amt.	Da.	Prod.	Due.	Amt.	Da.	Prod.
May 1,	240.10 ×	0 =	0	July 8,	6275 ×	68=	426700
July 8,	219.63 ×	68 =	14934.84				
Aug. 6,	201 ×	97 =	19497				
	660.73		34431.84		6275		426700
					660.73		34431.84
Balance due $5614.27.					5614.27		)392268.16
To be paid May 1, + 70 da.=July 10.							70.00

36. $4800 — $3840 = $960, L's gain in 6 mo. = $4\frac{1}{6}$% per mo.

$\$9600 \div (1 + \overline{4\frac{1}{6} \times 12}) = \$6400$, M's capital.
$\$4160 - \$2560 \div \overline{\$2560 \times .04\frac{1}{6}} = 15$ mo., N's time. } *Ans.*

37. \$536.78 + int. for 3 mo. 8 da. = \$540.18
\$425.36 + " 2 " 4 " = 429.90
\$259.25 + " 1 " 20 " = 261.41
\$786.36 = 786.36
April 24. \$2017.85, *Ans.*

38. The portion of the principal paid each year must be such that the first payment at comp. int. for 3 years, the 2d for 2 years, and the last for 1 year will all be equal. These payments will be proportional to the present worth of \$1, due respectively in 3, 2, and 1 year.

Hence, $\frac{1}{(1.06)^3}$, $\frac{1}{(1.06)^2}$, and $\frac{1}{(1.06)}$, are the proportional quantities. Reducing these to a common denominator and taking the numerators, we have 1, 1.06, and 1.1236.

Their sum, 3.1836 : 1 :: 6000 : x, the principal paid the first year. $x=\$1884.66$, to this add one year's int. on \$6000, \$360, and we have for the full payment, \$2244.66.

Art. 802.

2. 37×37; 42×42; 56×56; 75×75.
Ans. 1369; 1764; 3136; 5625.

3. $15\times15\times15=3375$; $18\times18\times18=5832$, etc., *Ans.*

4. $63\times63=3969$; $48\times48\times48=110592$.
$32\times32\times32\times32=1048576$.
$12\times12\times12\times12\times12=248832$. } *Ans.*

6. $\frac{7}{16}\times\frac{7}{16}=\frac{49}{256}$; $\frac{12}{31}\times\frac{12}{31}\times\frac{12}{31}=\frac{1728}{29791}$, *Ans.*

7. $\frac{9}{14}\times\frac{9}{14}\times\frac{9}{14}\times\frac{9}{14}=\frac{6561}{38416}$.
$\frac{5}{2}\times\frac{5}{2}\times\frac{5}{2}\times\frac{5}{2}\times\frac{5}{2}=\frac{3125}{32}=97\frac{21}{32}$. } *Ans.*

8. $25.4 \times 25.4 = 645.16$, *Ans.*

9. $106 \times 106 \times 106 = 1191016$, *Ans.*

10. $\frac{177}{4} \times \frac{177}{4} = \frac{31329}{16} = 1958\frac{1}{16}$, *Ans.*

11. $\frac{11}{15} \times \frac{11}{15} \times \frac{11}{15} \times \frac{11}{15} = \frac{14641}{50625}$, *Ans.*

12. $.0342 \times .0342 = .00116964$, *Ans.*

13. $.5 \times .5 \times .5 \times .5 \times .5 \times .5 = .015625$, *Ans.*

14. $36.02 \times 36.02 \times 36.02 = 46733.803208$, *Ans.*

15. $.40316 \times .40316 \times .40316 = .065528814274496$, *Ans.*

16. $182\frac{1}{8} = \frac{1457}{8}$; $\frac{1457}{8} \times \frac{1457}{8} = 33169\frac{33}{64}$, *Ans.*

17. $4.075 \times 4.075 = 16.605625$, *Ans.*

18. $1.9 \times 1.9 \times 1.9 \times 1.9 \times 1.9 = 24.76099$, *Ans.*

19. $.0063 \times .0063 \times .0063 = 000000250047$, *Ans.*

20. $4.6 \times 4.6 \times 4.6 \times 25 \times 25 \times 25 = 1520875$, *Ans.*

21. $6.75 \times 6.75 \times 6.75 \times 6.75 - \overline{7.25 \times 7.25} = 2023.37890625$, *Ans.*

22. $\frac{7}{8} \times \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5} \times \frac{22}{8} \times \frac{22}{8} = 5.887$, *Ans.*

23. $8 \times 8 \times 8 \times 8 \times 8 \times 8 \div .4096 = 640000$, *Ans.*

24. $2.5 \times 2.5 \times 2.5 \times 12.75 \times 12.75 = 2540.0390625$, *Ans.*

25. $7.5 \times 7.5 \times 7.5 \div (1.5 \times 1.5 \times 1.5) = 125$, *Ans.*

26. $4 \times 4 \times 4 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 12 \times 12 \times 12 \div (4 \times 4 \times 10 \times 10 \times 10 \times 10 \times 3 \times 3) = 1200$, *Ans.*

Art. 803.

3. $42^2 = 40^2 + 2^2 + \overline{2 \times 40 \times 2} = 1764$, *Ans.*

4. $48^2 = 40^2 + 8^2 \times \overline{2 \times 40 \times 8} = 2304$, *Ans.*

5. $56^2=50^2+6^2+\overline{2\times 50\times 6}=3136$, *Ans.*

6. $98^2=90^2+8^2+\overline{2\times 90\times 8}=9604$, *Ans.*

7. $125^2=120^2+5^2+\overline{2\times 120\times 5}=15625$, *Ans.*

8. $105^2=100^2+5^2+\overline{2\times 100\times 5}=11025$, *Ans.*

9. $225^2=220^2+5^2+\overline{2\times 220\times 5}=50625$, *Ans.*

10. $197^2=190^2+7^2+\overline{2\times 190\times 7}=38809$, *Ans.*

11. $342^2=340^2+2^2+\overline{2\times 340\times 2}=116985$, *Ans.*

Art. 804.

2. $34^3=30^3+\overline{3\times 30^2\times 4}+\overline{3\times 30\times 4^2}+4^3=39304$, *Ans.*

4. $48^3=40^3+\overline{3\times 40^2\times 8}+\overline{3\times 40\times 8^2}+8^3=110592$, *Ans.*

5. $64^3=60^3+\overline{3\times 60^2\times 4}+\overline{3\times 60\times 4^2}+4^3=262144$, *Ans.*

6. $95^3=90^3+\overline{3\times 90^2\times 5}+\overline{3\times 90\times 5^2}+5^3=857375$, *Ans.*

7. $125^3=120^3\times\overline{3\times 120^2+5}+\overline{3\times 120\times 5^2}+5^3=1953125$.

Art. 810.

2. 64=2 . 2 . 2 . 2 . 2 . 2 ; 2 . 2 . 2=8, *Ans.*
256=2 . 2 . 2 . 2 . 2 . 2 . 2 . 2 ; 2 . 2 . 2 . 2=16, *Ans.*
576=2 . 2 . 2 . 2 . 2 . 2 . 3 . 3 ; 2 . 2 . 2 . 3=24, *Ans.*
6561=3 . 3 . 3 . 3 . 3 . 3 . 3 . 3 ; 3 . 3 . 3 . 3=81, *Ans.*

3. 729=3 . 3 . 3 . 3 . 3 . 3 ; 3 . 3=9, *Ans.*
2744=2 . 2 . 2 . 7 . 7 . 7 ; 2 . 7=14, *Ans.*
9261=3 . 3 . 3 . 7 . 7 . 7 ; 3 . 7=21, *Ans.*
3375=3 . 3 . 3 . 5 . 5 . 5 ; 3 . 5=15, Ans.

Art. 313.

3. 72‘25 (85, *Ans.*
64
165) 825
825
0

4. 5‘85‘64 (242, *Ans.*
4
44) 185
176
482) 964
964
0

16. 1‘96.13‘69 (14.0048 +, *Ans.*
1
24) 96
96
28004) 136900
112016
280088) 2488400
2240704

18. 58.14‘06‘25 (7.625, *Ans.*
49
146) 914
876
1522) 3806
3044
15245) 76225
76225
0

22. 9.00‘00‘99‘40‘09 (3.0000165
9
600001) 0000994009
600001
6000026) 39400800
36000156
60000325) 340064400

Note.—For every cipher in the root annex one cipher to the trial divisor, also one period to the dividend.

25. $\sqrt{\frac{5}{6}}=\sqrt{.833333333333}=.91287+$, *Ans.*

27. $\sqrt{.1369}=.37$; $\sqrt{1296}=36$; $36+.37=36.37$, *Ans.*

28. $\sqrt{36.36}=6.02992+$; $\sqrt{.25^2}=.25$;
$6.02992\times.25=1.50748+$, *Ans.*

29. $2.8^3=21.952$; $\sqrt{.117649}=.343$;
$21.952\div.343=64$, *Ans.*

30. $\sqrt{\frac{3136}{7056}}=\frac{56}{84}=\frac{2}{3}$; $\sqrt{\frac{225}{2025}}=\frac{15}{45}=\frac{1}{3}$; $\frac{2}{3}-\frac{1}{3}\div4=\frac{1}{12}$.

31. $\frac{9^{\frac{1}{2}}}{\sqrt{3^2}}=\frac{3}{3}=1$; $\frac{3^2}{\sqrt{9^2}}=\frac{9}{9}=1$; $1\times1=1$, *Ans.*

32. $\sqrt{2.6896}=1.64$; $\sqrt{.256}=.5059+$;
$1.64+.3729=2.0129$; $2.0129\times\frac{3}{4}\times.5059=.7637+$.

33. $\sqrt{27.04}=5.2$; $(7.2-5.2)^5=32$; $(\frac{2}{3})^2=\frac{4}{9}$;
$32\div\frac{4}{9}=72$, *Ans.*

34. $\sqrt{81}-\sqrt{16}=9-4=5$; $\sqrt{169}+\sqrt{25}=13+5=18$;
$5\times18=90$, *Ans.*

35. $\sqrt{264^2}=264$; $\sqrt{5.3361}=2.31$; $2.3^3=12.167$;
$\sqrt{3.61}=1.9$;
$264\times4.41\div2.31-(12.167\times1.9)=480.8827$, *Ans.*

Art. 815.

1. $\sqrt{1016064}=1008$, length of side in feet, *Ans.*

2. $\sqrt{160\times361}=240.33$, length of side in rods, *Ans.*

3. $\sqrt{208\times13}=52$, length of side in rods, *Ans.*

4. 251 A. 65 P.$=$40225 P.;
$\sqrt{40225}=200.56+$, *Ans.* in rods.

5. $\sqrt{21170.25}=145.5$, rods square, *Ans.*

6. $\sqrt{216\times24}=72$, length of side of square in rods.
Distance around rectangular field is 480 rods.
" " square " 288 "

$$\overset{\text{rd.}}{480} : \overset{\text{rd.}}{288} :: \$312 : x;\ x=\$187.20,\ \textit{Ans.}$$

Art. 819.

3. 15‘625 (25, *Ans.*

$$
\begin{array}{lr|r}
 & & \underline{8} \\
3\times20^2 = & 1200 & 7625 \\
3\times20\times5 = & 300 & \\
5^2 = & \underline{25} & \\
 & 1525 & \underline{7625} \\
 & & 0
\end{array}
$$

4. 166‘375 (55, *Ans.*

$$
\begin{array}{lr|r}
 & & \underline{125} \\
3\times50^2 - = & 7500 & 41375 \\
3\times50\times5 = & 750 & \\
5^2 = & \underline{25} & \\
 & 8275 & \underline{41375} \\
 & & 0
\end{array}
$$

5. 1‘030‘301 (101, *Ans.*

$$
\begin{array}{lr|r}
 & & \underline{1} \\
3\times100^2 = & 30000 & 30301 \\
3\times100\times1 = & 300 & \\
1^2 = & \underline{1} & \\
 & 80301 & \underline{30301} \\
 & & 0
\end{array}
$$

Annexing 2 ciphers to trial divisor, as in note 1 under rule, gives trial divisor 30000, or say 3×100^2.

8.

$$\begin{array}{rr|l}
 & & 4'080'659'192\ (1598,\ \textit{Ans.} \\
 & & 1 \\
\hline
3\times10^2 = & 300 & 3080 \\
3\times10\times5 = & 150 & \\
5^2 = & \underline{25} & \\
 & 475 & \underline{2375} \\
3\times150^2 = & 67500 & 705659 \\
3\times150\times9 = & 4050 & \\
9^2 = & \underline{81} & \\
 & 71631 & \underline{644679} \\
3\times1590^2 = & 7584300 & 60980192 \\
3\times1590\times8 = & 38160 & \\
8^2 = & \underline{64} & \\
 & 7622524 & \underline{60980192} \\
 & & 0
\end{array}$$

10. $\sqrt[3]{\frac{1000}{1331}} = \frac{\sqrt[3]{1000}}{\sqrt[3]{1331}} = \frac{10}{11}$, *Ans.*

11. $\sqrt[3]{\frac{13824}{15625}} = \frac{24}{25}$, *Ans.*

12. $\sqrt[3]{2\frac{7}{8}} = \sqrt[3]{2.875} = 1.42+$, *Ans.*

13. $\sqrt[3]{39304} = 34$, *Ans.*

14. $\sqrt[3]{.091125} = .45$, *Ans.*

15.

$$\begin{array}{rcr|l}
 & & & 12.812'904\,(2.34,\ \textit{Ans.} \\
 & & & \underline{8} \\
3\times20^2 & = & 1200 & 4812 \\
3\times20\times3 & = & 180 & \\
3^2 & = & \underline{9} & \\
 & & \underline{\underline{1389}} & \underline{4167} \\
3\times230^2 & = & 158700 & 645904 \\
3\times230\times4 & = & 2760 & \\
4^2 & = & \underline{16} & \\
 & & \underline{\underline{161476}} & \underline{645904} \\
 & & & 0
\end{array}$$

16.

$$\begin{array}{rcr|l}
 & & & 98'867'482'624\,(4624,\ \textit{Ans.} \\
 & & & \underline{64} \\
3\times40^2 & = & 4800 & 34867 \\
3\times40\times6 & = & 720 & \\
6^2 & = & \underline{36} & \\
 & & \underline{\underline{5556}} & \underline{33336} \\
3\times460^2 & = & 634800 & 1531482 \\
3\times460\times2 & = & 2760 & \\
2^2 & = & \underline{4} & \\
 & & \underline{\underline{637564}} & \underline{1275128} \\
3\times4620^2 & = & 64033200 & 256354624 \\
3\times4620\times4 & = & 55440 & \\
4^2 & = & \underline{16} & \\
 & & \underline{\underline{64088656}} & \underline{256354624} \\
 & & & 0
\end{array}$$

17. $.000'529'475'129\,(.0809$, *Ans.*

$$\begin{array}{r|r} & 512 \\ \hline 1920000 & 17475129 \\ 21600 & \\ 81 & \\ \cline{1-1} 1941681 & 17475129 \\ \hline\hline & 0 \end{array}$$

There being a cipher in the root, annex 2 ciphers to the original trial divisor for a new one.

18. $\sqrt[3]{\frac{1}{2}}=\sqrt[3]{.500}=.7936+$, *Ans.*

19. $\sqrt[3]{1.44}=1.12+$; $2.5^{\frac{5}{3}}=\sqrt[3]{2.5^5}=4.64+$; $1.12+4.64=5.76+$, *Ans.*

20. $\sqrt[3]{\frac{1331}{3375}}=\frac{11}{15}$; $\sqrt[3]{\frac{125}{512}}=\frac{5}{8}$; $\frac{11}{15}\times\frac{5}{8}=\frac{11}{24}$, *Ans.*

21. $\sqrt[3]{.4096-.2368}=\sqrt[3]{.1728}=.5569+$, *Ans.*

22. $\sqrt[3]{54.872}=3.8$; $\sqrt[3]{21.952}=2.8$; $3.8-2.8=1$, *Ans.*

23. $\sqrt[3]{103.823}=4.7$; $\sqrt[3]{.125}=.5$; $24.8+4.7\times.5=14.75$.

24. $\sqrt[3]{16^6}=16^{\frac{6}{3}}=16^2=256$; $\sqrt[3]{64}=4$; $\sqrt[3]{.512}=.8$; $(\overline{256\div4}-4)\times.8=48$, *Ans.*

Art. 821.

1. $\sqrt[3]{46656}=36$; 36 in., or 3 feet, *Ans.*

2. $\sqrt[3]{16\times8\times4}=8$; 8 feet, *Ans.*

3. $\sqrt[3]{32\times27\times16}=24$; 24 in., or 2 feet, *Ans.*

4. $\sqrt[3]{91125}=45$; edge of cube 45 ft.; $45^2\times6=12150$.

5. $\sqrt[3]{2150.42\times150}=68+$; 68 in., or 5 ft. 8 in.+, *Ans.*

6. $\sqrt[3]{231\times31\frac{1}{2}\times200}=113.3$; 9 ft. 5.3 in.+, *Ans.*

7. $\sqrt[3]{231\times4000}=97.4$; 97.4 in., or 8 ft. 1.4 in., *Ans.*

Art. 822.

2. The 4th root equals the square root of the sq. root.
$\sqrt{5636405776}=75076$; $\sqrt{75076}=274$, *Ans.*

3. $\sqrt{12230590464}=110592$; $\sqrt[3]{110592}=48$, *Ans.*

4. $\sqrt{1099511627776}=1048576$; $\sqrt{1048576}=1024$;
$\sqrt{1024}=32$, *Ans.*

5. $\sqrt{25632972850442049}=160103007$;
$\sqrt[3]{160103007}=543$, *Ans.*

6. $\sqrt[3]{1.577635}=1.1641+$; $\sqrt[3]{1.1641}=1.05+$, *Ans.*

Art. 829.

3. $203-\overline{39\times5}=8$, *Ans.*

4. $1+\overline{8\times2}=17$, *Ans.*

5. $5+\overline{7\times4}=33$, *Ans.*

6. $2+\overline{49\times3}=149$, *Ans.*

7. $100-\overline{12\times7}=16$; *Ans.*

8. $\frac{2}{3}+\overline{19\times\frac{3}{8}}=7\frac{19}{24}$, *Ans.*

Art. 830.

2. $17-1\div8=2$, *Ans.*

3. $15-3\div6=2$, *Ans.*

4. $51-1\div75=\frac{2}{3}$, *Ans.*

5. $44-8\div9=4$, *Ans.*

6. $4160-800\div60=56$; $56\div800=.07$; 7%, Ans.

Note.—In 60 yr. the interest is added 60 times, making with the first term 61 terms.

7. $2\frac{1}{2}-0\div17=\frac{5}{34}$, *Ans.*

Art. 831.

2. $17-1\div2+1=9$, *Ans.*
3. $75-5\div5+1=15$, *Ans.*
4. $20-\frac{1}{2}\div6\frac{1}{2}+1=4$, *Ans.*
5. $1.54-.50\div4+1=27$, *Ans.*
6. $\$500\times.07=\$35=$com. difference.
   $885-500\div35=11$, the No. of years, *Ans.*

The number of terms in the series is 1 more, or 12.

Art. 832.

2. $5+75\times\overline{15\div2}=600$, *Ans.*
3. $4+40\times\overline{7\div2}=154$, *Ans.*
4. $250+0\times\overline{1000\div2}=125000$, *Ans.*
5. $1+12\times\overline{12\div2}=78$, *Ans.*
6. $48\frac{1}{4}-16\frac{1}{12}=32\frac{1}{6}$, com dif.
   $16\frac{1}{12}+\overline{59\times32\frac{1}{6}}=1913\frac{11}{12}$, last term.
   $16\frac{1}{12}+1913\frac{11}{12}\times\overline{60\div2}=57900$, *Ans.*

Art. 840.

3. $1\times(\frac{1}{2})^7=\frac{1}{128}$, *Ans.*
4. $6\times4^5=6144$, *Ans.*
5. $192\div2^6=3$, *Ans.*
6. $\$1\times2^{19}=\$524288$, *Ans.*
7. $\$250\times1.06^4=\$315.619+$, *Ans.*
8. $1874-1634\div12=20$, the No. of times it doubled.
   $20+1=21$, No. of terms.
   $1\times2^{20}=1048576$ cents ; \$10485.76, *Ans.*

Art. 841.

2. $\frac{1}{256}\div1=\frac{1}{256}$; $\sqrt[8]{\frac{1}{256}}=\frac{1}{2}$, *Ans.*

3. $5000\div8=625$; $\sqrt[4]{625}=5$, *Ans.*

4. $\sqrt[4]{7\div.0112}=5$, *Ans.*

5. $15\frac{3}{16}\div\frac{1}{48}=729$; $\sqrt[6]{729}=3$, *Ans.*

Art. 842.

2. $\frac{1}{256}\div1=\frac{1}{256}$; $(\frac{1}{2})^x=\frac{1}{256}$; $x=8$;
$8+1=9$, No. terms, *Ans.*

3. $1458\div2=729$; $3^x=729$; $x=6$;
$6+1=7$, No. terms, *Ans.*

4. $\frac{1}{5}\div\frac{1}{640}=128$; $2^x=128$; $x=7$;
$7+1=8$, No. terms, *Ans.*

Art. 843.

3. $384\times2-3\div1=765$, *Ans.*

4. $\frac{8}{405}\times\frac{1}{3}=\frac{8}{1215}$; $4\frac{4}{5}-\frac{8}{1215}\div\frac{2}{3}=7\frac{77}{405}$, *Ans.*

5. $8-\overline{0\times\frac{1}{2}}\div\frac{1}{2}=16$, *Ans.*

6. $1-\overline{0\times\frac{1}{3}}\div\frac{2}{3}=1\frac{1}{2}$, *Ans.*

7. $1-\overline{0\times\frac{1}{2}}\div\frac{1}{2}=2$, *Ans.*

8. $7\times3^3=189=$last term; $189\times3-7\div2=280$, *Ans.*

9. $1\times2^9=512=$last term; $512\times2-1\div1=$ \$1023.

10. $2\times3^{11}=354294$, last term;
$354294\times3-2\div2=531440$; *Ans.* in cts. = \$5314.40.

Art. 853.

3. $5\frac{1}{2}$ yr. $=22$ quarters.
$\$150\times.015=\$2.25$, com. dif.
$\$150+\overline{\$2.25\times21}=\$197.25$, last term.
$\$150+\$197.25\times22\div2=\$3819.75$, *Ans.*

4. $\$300=$ first term.
$\$300\times.06=\$18$, com. dif.
$\$300+\overline{\$18\times4}=\$372$, last term.
$\$300+\$372\times5\div2=\$1680$, sum of terms $=$ amt. of annuity.
$\$1680\div1.30=\$1292.31$, Pres. worth, *Ans.*

5. $\$500=$ first term.
$\$500\times.10=\$50$, com. dif.
$\$500+\overline{\$50\times9}=\$950$, last term.
$\$500+\$950\times10\div2=\$7250$, sum.
$\$7250\div2=\$3625$, *Ans.*

6. $\$3450\div\$500$, shows that without interest the time would be less 7 years.
$500\times.06=30$, com. dif.
$500+530+560$, etc., to amt. to 3450, requires 6 terms. Hence, 6 years, *Ans.*

7. $s=(a+l)\times\frac{n}{2}$; $\$59760=(\$6000+l)\,4=\$24000+4l$.
Whence $4\,l=\$35760$, or $l=\$8940$.
$\frac{l-a}{n-1}=d.$; $\frac{\$8940-\$6000}{7}=\$420=d.$
$\$420\div\$6000=.07$, or 7%, *Ans.*

8. 1 yr. 6 mo. = 18 mo.; No. terms 18.
$\$20 \times .06 \div 12 = \$.10 =$ difference.
$\$20 + \overline{\$.10 \times 17} = \$21.70$, last term.
$\$20 + \$21.70 \times 18 \div 2 = \$375.30$, *Ans.*

Art. 854.

3. No of terms = 25.
Ratio = 1.06.
First term = 1.
Last term $= 1 \times (1.06)^{24} = (1.06)^{24}$.
Sum $= (1.06)^{24} \times 1.06 - 1 \div .06 = 54.8645$.

If an annuity of \$1 amounts to \$54.8645, to amount to \$16459.35 will require as many dollars of annuity as $\$16459.35 \div 54.8645 = \$300$, *Ans.*

4. $\$700 \times (1.06)^7 - \$700 \div .06 = \$5875.683$, amount.
$\$5875.683 \div 1.50363 = \$3907.665$, *Ans.*

5. $\$200 \times (1.06)^{12} - \$200 \div .06 = \$3373.99$, amount.
Amt. of \$1 for 18 yr. $= \$2.854339$.
$\$3373.99 \div 2.854339 = \$1182.05+$, *Ans.*

6. This may be considered a geometrical series, of which the first term is the present worth of \$600 due in 8 yr., and the last term the pres. worth of \$1 due in 1 year.
$\$600 \div 1.593848 = \$376.45$, first term.
$\$600 \div 1.06 = \$566.04$, last term.
$(\$566.04 \times 1.06 - \$376.45) \div .06 = \$3725.87+$, *Ans.*

7. $\$100 \times 2.653298 - \$100 \div .05 = \$3306.596$. amt.
$\$3306.596 \div 5.253348 = \$629.43$, *Ans.*;
Present worth of \$3306.596 due in 34 years @ 5%.

Art. 882.

2. $30 \times 40 \div 2 = 600$; area, 600 square feet, *Ans.*

3. $12.5 \times 6.75 \div 2 = 42.1875$; area, $42\frac{3}{16}$ sq. ft., *Ans.*

4. $25.01 \times 18.14 \div 2 = 226.84$; area, 22 A. 6 ch. 13.45 P.

5. $\$60 \times (15.48 \times 9.67 \div 2 \div 10) = \$449.07$, *Ans.*

6. $\$.40 \times \overline{35 \times 21 \div 2} = \$147$, *Ans.*

7. $28 \times 15 \div 2 = 210$; area, 210 square feet, *Ans.*

Art. 883.

2. $20\frac{1}{4} \times 2 \div 9 = 4.5$; $4\frac{1}{2}$ feet, *Ans.*

3. $65 \times 2 \div 10 = 13$; 13 in., *Ans.*

4. $588 \times 2 \div 42 = 28$; 28 rods, *Ans.*

5. $6\frac{1}{2}$ A. $\times 160 \times 30\frac{1}{4} \times 2 \div 17 = 3701\frac{3}{17}$;
$3701\frac{3}{17}$ yd. $=$ 672 rd. $5\frac{3}{17}$ yd., *Ans.*

6. 5 A. 33 P. $=$ 833 P.; 12.25 ch. $=$ 49 rd.;
$833 \times 2 \div 49 = 34$; 34 rd. $= 8\frac{1}{2}$ ch., *Ans.*

7. $\$1050 \div \$5.25 = 200$; $200 \times 2 \div 8 = 50$; 50 rd., *Ans.*

Art. 884.

2. $\dfrac{20+15+15}{2} = 25$; $25-20=5$; $25-15=10$;

$25-15=10$; $\sqrt{25 \times 5 \times 10 \times 10} = 111.85$;
111.85 square feet, *Ans.*

3. $\dfrac{25+36+49}{2} = 55$; $55-25=30$; $55-36=19$;

$55-49=6$; $\sqrt{55 \times 30 \times 19 \times 6} = 433.7$;
3 sq. ft. 1.7 sq. in., *Ans.*

4. Half-sum$=105$; $105-70=35$.
$\sqrt{105\times 35\times 35\times 35}\div 160=13.26$; 13 A. 41.76 P.

5. $\dfrac{30+20+18}{2}=34$; $34-30=4$; $34-20=14$;
$34-18=16$; $\sqrt{34\times 4\times 14\times 16\times 2}=349.07$;
349.07 square feet, *Ans.*

Art. 886.

2. $\sqrt{36^2+15^2}=39$; 39 feet, *Ans.*

3. $\sqrt{20^2+16^2}=25.6$; 25 ft. 7.34 in., *Ans.*

4. $\sqrt{25^2+23^2}=33.97$; 33.97 chains, *Ans.*

5. $\sqrt{20^2+16^2}=25.61$; $\sqrt{25.61^2+12^2}=28.28$;
28 ft. 3.36 in., *Ans.*

Art. 887.

2. $\sqrt{53^2-28^2}=45$; 45 yards, *Ans.*

3. $\sqrt{15^2+12^2}=19.209$; 19 ft. 2.5 in., *Ans.*

4. $\sqrt{380^2-120^2}=360.5$; 360 ft. 6⅔ in., *Ans.*

5. $\sqrt{52^2-48^2}=20$; 20 feet, *Ans.*

Art. 898.

2. $10.5\times 8=84$; area, 84 square feet, *Ans.*

3. $8.75\times 6\div 10=5\frac{1}{4}$; area, 5¼ acres, *Ans.*

Art. 899.

2. $\sqrt{178+146}\div 2\times 69=11178$; area, 11178 sq. ft.

3. $(18+25\div 2\times 16)\div 12=28\frac{2}{3}$; area, 28⅔ sq. ft., *Ans.*

4. $(38+26\div 2\times 10)\div 160=2$; area, 2 acres, *Ans.*

Art. 900.

2. $(9+3\div2)\times35.5=213$; area, 213 square feet, *Ans.*

3. $(20.453+50.832\div2\times80)\div160=17.82\frac{1}{8}$;
Area, $17.82\frac{1}{8}$ acres, *Ans.*

Art. 904.

3. 50 ft. $\div3.1416=15.9$ ft. $+=15$ ft. 10.9 in. +, *Ans.*

4. 18.5 ft. $\div3.1416=5.88$ ft. $+=5$ ft. 10.6 + in., *Ans.*

5. 31.416 ft. $\div3.1416\div2=5$ feet, *Ans.*

6. 14 in. $\times2\times3.1416=87.96$ in. $+=7$ ft. 3.96 in., *Ans.*

Art. 905.

4. 200 ch. $\times(\overline{200\div3.1416}\div4)\div10=318.3$;
Area, 318.3 acres, *Ans.*

5. 480 rd. $\times(\overline{480\div3.1416}\div4)\div160=114.59$;
Area, 114.59 acres, *Ans.*

Art. 906.

3. $\sqrt{38.4846\div.7854}=7$; diameter, 7 rods, *Ans.*

4. $\sqrt{286.488\div.7854}=19.098$; diam., 19.098 ft., *Ans.*
19.098 ft. $\times3.1416=59.97+$; circum., 59.97 ft., *Ans.*

Art. 907.

2. $\sqrt{200^2\div2}=141.42$; 141.42 feet, *Ans.*

3. $104\div3.1416\times.7071=23.4+$; 23.4 yd. +, *Ans.*

4. $\sqrt{78.54\div7854}=10$; diameter, 10 feet.
10 ft. $\times.7071=7.07+$; 7.07 feet +, *Ans.*

Art. 908.

2. $\overline{7.75+4.25}\times\overline{7.75-4.25}\times .7854=32.98+$;
32.98 square feet, *Ans.*

3. $(35.75+16.25)\ (35.75-16.25)\times .7854=796.39+$;
796.39 square feet, *Ans.*

4. 1 A. 154.16 P.$=$314.16 P.;
$\sqrt{314.16\div .7854}=20$ rd., diameter.

$$\left.\begin{array}{l}\overline{20+10}\times\overline{20-10}\times .7854=235.62\text{ P.}=1\text{ A.}\\ \quad 75.62\text{ P., area of land.}\\ 314.16\text{ sq. rd.}-235.62\text{ sq. rd.}=78.54\text{ P.,}\\ \quad\text{area of water.}\end{array}\right\}\textit{Ans.}$$

Art. 909.

2. $\sqrt{42\times 168}=84$, *Ans.*

3. $\sqrt{64\times 12.25}=28$, *Ans.*

4. $\sqrt{\frac{36}{49}\times\frac{4}{81}}=\frac{4}{21}$, *Ans.*

5. $\sqrt{36\times 20}=32.86+$; 32.86 pounds, *Ans.*

Art. 910.

5. 283 A. 107 P.$=$45387 P.
$3 : 45387 :: 3^2 : x^2$; $x=369$: 369 rods long, *Ans.*
$3 : 45387 :: 1^2 : x^2$; $x=123$ rods wide, *Ans.*

6. $55.1 : 300 :: 1.5^2 : x^2$; $x=3.5$ in., *Ans.*

7. The area of a triangle whose sides are 13, 14 and 15 ft., is 84 sq. ft.

$$\left.\begin{array}{l}84 : 24276 :: 13^2 : x^2;\ x=221\text{ feet.}\\ 84 : 24276 :: 14^2 : x^2;\ x=238\text{ feet.}\\ 84 : 24276 :: 15^2 : x^2;\ x=255\text{ feet.}\end{array}\right\}\textit{Ans.}$$

8. The cost to inclose depends upon the circumference. We then consider the cost as a representative of the circumference.

$1 : \frac{1}{5} :: 167.7^2 : x^2$; $x = \$75$, *Ans.*

9. $2\text{ A.} : 8\text{ A.} :: 63.39^2\text{ rd.} : x^2\text{ rd.}$; $x = 126.78$ rd., *Ans.*

Art. 911.

1. $20\text{ A.} = 3200\text{ P.}$; $\sqrt{3200} \times 4 = 226.274+$, perimeter of square.

$\$2.40 \times 226.274 = \$543.16$, cost.

$\frac{1}{5} : 3200 :: 1^2 : x^2$; $x = 126.491$, length in rods.

$\frac{1}{5} : 3200 :: \frac{1}{5}^2 : x^2$; $x = 25.298+$, width in rods.

$126.491 + 126.491 + 25.298 + 25.298 = 303.578+$, perimeter of rectangle.

$\$2.40 \times 303.6 = \$728.59$, cost of rectangle.

$\$728.59 - \$543.16 = \$185.43$, *Ans.*

2. $\sqrt{25^2 + 20^2 + 15^2} = 35.35$; 35.35 feet, *Ans.*

3. $1\frac{1}{4}$ sq. mi. $= 128000$ P.

$\sqrt{128000 \div .7854} = 403.7+$; 403.7 rods, *Ans.*

4. $\$75 \times (\overline{40 + 22} \div 2 \times 25) \div 10 = \$5812.50$, *Ans.*

5. The altitude of this rhombus is that of a right-angled triangle, whose hypothenuse is 15 ft. and base 9 ft.

$\sqrt{15^2 - 9^2} = 12$; 12 feet the altitude.

$\$.18 \times \overline{15 \times 12} = \$32.40$, *Ans.*

6. $\sqrt{50^2 - 4^2} = 49.839 =$ radius; diameter, 99.678 ft.

$99.678\text{ ft.} \times 3.1416 = 313.14\text{ ft.} =$ circumference.

$\overline{99.678 \times 313.14} \div 4 = 7803.79$;

7803.79 sq. ft. $= 28.66$ P., area, *Ans.*

7. $40^2-(\sqrt{40^2\div 2})^2=800$; 800 P.=5 A., *Ans.*

8. Half-sum of sides=71; $71-40=31$; $71-48=23$;
$71-54=17$; $\sqrt{71\times 31\times 23\times 17}=927.68$;
$\$125\times\overline{927.68\div 160}=\$724.75$, *Ans.*

9. $1:4::10^2:x^2$; $x=20$; 20 feet, *Ans.*

10. $200^2\times .7854\div 2=15708$; 15708 P.=98 A. 28 P.

11. $2:1::100^2:x^2$; $x=70.71$, side of garden, inside the walk in rods.

100 rd.—70.71 rd.÷2=14.645 rd.+, *Ans.*

12. 540 A. 36 P.=86436 P.; $\sqrt{86436}=294$; 294 rd.
$\sqrt{86436\div 42}=45.36$; 45.36 rd., *Ans.*

13. 15 A.=2400 P.; $2400\div 30=80$; 80 rd., length.
80 rd.=1320 ft.; $\sqrt{1320^2-120^2}=1314.5$;
1314.5 ft.=79.68 rd.; $79.68\times 30\div 160=14.94$;
14.94 acres, *Ans.*

14. $12:48::3^2:x^2$; $x=6$; 6 inches, *Ans.*

Art. 918.

4. $6\times 3.1416\times 8+(6^2\times .7854\times 2)=207.3456$;
207.34 sq. ft.+, *Ans.*

5. $(4\frac{2}{3}+4\frac{2}{3}+3\frac{1}{4}+3\frac{1}{4})\times 8\frac{3}{4}+(4\frac{2}{3}\times 3\frac{1}{4}\times 2)=168\frac{7}{8}$;
$168\frac{7}{8}$ sq. ft., *Ans.*

6. $(4\times 2\times 3.1416\times 6.5)+(\overline{4\times 2^2}\times .7854\times 2)=$ 263.8944; 263.8944 sq. ft., *Ans.*

7. $15\times 18+(\frac{1}{2}\text{ of }\sqrt{6^2-3^2}\times 6\times 2)=301.176$;
301.176 sq. ft., *Ans.*

Art. 919.

3. $6.5 \times 6.5 \times 6.5 = 274.625$; $274\frac{5}{8}$ cu. ft., *Ans.*

4. $\$.30 \times 1.5 \times 1.5 \times 40 = \$27$, *Ans.*

5. $\overline{2.5^2} \times .7854 \times 15 = 73.63$; 73.63 cu. ft., *Ans.*

6. $7.9 \div 3.1416 = 2.5178+$, diameter.

$2.5178 \div 4 \times 7.9 = 4.9722+$, area.

$\$.45 \times (4.9722 \times 24) = \$53.70$, *Ans.*

Art. 925.

2. 17.5 ft. $\times\, 3.1416 = 54.978$ feet, circumference ;

54.978 ft. $\times\, \overline{30 \div 2} = 824.67$ sq. ft., *Ans.*

3. $8.5 \times 4 \times 10.5 + \overline{8.5 \times 8.5} = 429.25$; 429.25 sq. ft., *Ans.*

4. $6.75 \times 3.1416 \times 22.5 + (\overline{6.75^2} \times .7854) = 512.9+$;

512.9 sq. ft., *Ans.*

5. $\$.25 \times (5 \times 6 \times 30 \div 9) = \$25$, *Ans.*

Art. 926.

3. $\overline{2.5^2} \times .7854 \times 8 = 39.27$; 39.27 cu. ft., *Ans.*

4. Area of base $= 3.899$ sq. ft.

$(\$2.50 \times 3.897 \times 9) \div 3 = \$29.23$, *Ans.*

5. $\sqrt{130^2 - (40^2 + 30^2)} = 120$, alt. of pyramid.

$\sqrt{120^2 + 40^2} = 126.49$, slant height of end.

$\sqrt{120^2 + 30^2} = 123.69$, " " side.

$80 \times 60 \times 120 \div 3 = 192000$; 192000 cu. ft., vol., *Ans.*

$\overline{60 + 60} \times 126.49 \div 2 = 7589.4$, surface of ends.

$\overline{80 + 80} \times 123.69 \div 2 = 9895.2$, " sides.

$80 \times 60 \qquad = \underline{4800}$ " base.

22284.6 ; 22284.6 sq. ft., surface.

Art. 927.

2. $\overline{30+16}\times 7.5=345$; 345 square feet, *Ans.*

3. $(\overline{8\times 7}+\overline{4\times 7})\times 27.5\div 9=256\frac{2}{3}$; $256\frac{2}{3}$ sq. yd., *Ans.*

Art. 928.

2. $[(4^2\times .7854)+(3^2\times .7854)+$
$\sqrt{(4^2\times .7854)\times(3^2\times .7854)}]\times 2=58.1196$;
58.1196 cubic feet, *Ans.*

3. $(\overline{1.25\times 1.25}+\overline{1\times 1}+\sqrt{1.25^2\times 1^2})\times 10=38.125$;
38.125 cubic feet, *Ans.*

4. 5 ft.$\div 3.1416=1.5917$ ft. diameter of lower base.
3 ft.$\div 3.1416=.95502$ ft. " upper "
$1.5917\times 5\div 4=1.989625$, area of lower base in sq. ft.
$95502\times 3\div 4=.716265$ " upper " "
$\sqrt{1.989625\times .716265}=1.1935$;
$(1.989625+.716265+1.1935)\times\overline{50\div 3}=64.9898$;
64.9898 cubic feet, *Ans.*

Art. 932.

2. 3 ft.$\times 3.1416\times 9.4248$ feet, circumference.
$9.4248\times 3=28.2744$; 28.2744 square feet, *Ans.*

3. 2 ft.$\times 3.1416=6.2832$ feet, circumference.
$6.2832\times 2=12.5664$; 12.5664 square feet, *Ans.*

Art. 933.

2. $30\times 30\times 3.1416\times\overline{30\div 6}=14137.2$; 14137.2 cu. ft.

3. $10\times 10\times 3.1416\times\overline{10\div 6}=523.6$; 523.6 cu. yd., *Ans.*

Art. 934.

2. $\sqrt[3]{3000\div(2\times3\times4)}=5$; 2, 3, and 4 times 5 ft.; or 10 ft., 15 ft., and 20 ft are the dimensions, *Ans.*

3. $\sqrt[3]{30720\div(3\times4\times5)}=8$; 3, 4, and 5 times 8 ft.; or 24 ft., 32 ft., and 40 ft., *Ans.*

Art. 936.

1. $\sqrt{1050\div6}=13.2287+$, edge in feet, *Ans.*
$\overline{13.2287}^3=2315.03$, volume in cubic feet, *Ans.*

2. $\sqrt[3]{2150.42\times1250}=139+$; 139 in.$=$11 ft. 7 in., *Ans.*

3. $(\overline{7^2\times.7854}+\overline{5^2\times.7854}+\sqrt{(7^2\times.7854)+(5^2\times.7854)}$
$\times\overline{7\div3}=199.7534$, volume in cubic feet.
1728 cu. in. $\times\,199.7534\div231$ cu. in.$=$1494 gal., *Ans.*

4. $(1.25^2+.5^2+\sqrt{1.25^2\times.5})\times8=19.5$, No. of cu. ft.
\$.28 $\times\,19.5=$ \$5.46, *Ans.*

5. $1728\div(\frac{1}{2}\times\frac{1}{2}\times1)=6912$ in$=$576 ft., *Ans.*

6. 27 cu. ft. : 81 cu. ft. :: $10^3:x^3$;
$x=14.42$, No. of inches, *Ans.*

7. There will be 12 times as many board feet as cubic feet.
$(\frac{3}{4})^2+(\frac{1}{3})^2+\sqrt{(\frac{3}{4})^2\times(\frac{1}{3})^2}\times\overline{11\div3}\times12=40\frac{23}{36}$;
40 sq. ft. $7\frac{2}{3}$ sq. in., *Ans.*

8. $12^2\times6=864$, surface of cube, and also of sphere.
$12^3=1728$ cu. in.$=$1 cu. ft., vol. of cube.
$\sqrt{864\div3.1416}=16.58$, diameter of sphere.
$864\times16.58\div6=2387.52$;
2387.52 cu. in.$=$1 cu. ft. 659.5 cu. in., vol. of sphere.

9. $4.5^3 : 9^3 :: 18$ oz. : x ; $x = 144$ oz. $= 9$ lb., *Ans.*

10. $10 \times \overline{10 \times 3.1416} \times 10 \div 6 \div 2 \times 1728 \div 231 \div 6 =$ 326.4 ; 326.4 min. $=$ 5 hr. 26 min. 24 sec., *Ans.*

11. 75 hhd. $=$ 4725 gal. $=$ 1091475 cu. in. $=$ 631.64 cu. ft., contents of cistern.

$8^2 \times .7854 \times 1 = 50.2656$, No. of cu. ft. in cistern 1 ft. deep.

631.64 cu. ft. $\div$ 50.2656 cu. ft. $=$ 12.56, No. of feet in depth, *Ans.*

12. $8^2 \times .7854 \times 4 \div 3 \times 1728 \div 2150.42 = 53.855$, No. of bushels, *Ans.*

Art. 937.

2. $21 + (\overline{30 - 21} \times \frac{2}{3}) = 27$;
$27^2 \times 40 \times .0034 = 99.144$, No. gal., *Ans.*

3. $26 + (\overline{31 - 26} \times .6) = 29$;
$29^2 \times 42 \times .0034 = 120.0948$, No. gal., *Ans.*

APPENDIX.

MIXED PROBLEMS.

109. *1.* 4 sq. ft. 4 sq. in.=580 sq. in., representing 580 sq. mi.

640 A. × 580=371200 acres, *Ans.*

2. \$1 cash is the same as \$1.03 due in 6 mo.

Hence ratio of the prices is 100 to 103, *Ans.*

3. 5 of every 12 lb. is of the cheaper tea and 7 of every 12 lb. of the dearer.

$$\begin{array}{rl} \$.50 \times 5 = & \$2.50 \\ .80 \times 7 = & \underline{5.60} \\ & \$8.10\text{, cost of 12 lb.} \end{array}$$

$\$8.10 \times 1.25 \div 12 = \$.843\frac{3}{4}$, *Ans.*

4. $\sqrt{80\text{ P.} \div .7854} = 10.09$ rd., diameter of plot.

2 yd. on each side=4 yd.=.7272+ rod.

10.09 rd.—.7272 rd.=9.3628 rd., diam. of inner circle.

$9.3628^2 \times .7854 = 68.849+$ sq. rd., *Ans.*

5. $\$46 \div .92 = \$50$, cost of calves and sheep sold.

If $\frac{1}{4}$ calves $+\frac{2}{5}$ sheep cost \$50,

$\frac{4}{4}$ " $+\frac{8}{5}$ " " 200; but by conditions

$\frac{4}{4}$ " $+\frac{5}{5}$ " " 152, hence by subtraction

$\frac{3}{5}$ " " \$48;

$\$48 \div \frac{3}{5} = \$80$, cost of sheep.

$\$152 - \$80 = \$72$, cost of calves.

$\$72 \div \$6 = 12$, No. calves; $\$80 \div \$4 = 20$, No. sheep.

6. $1 × 1.04 × 1.04 − $1 = $.0816 = int. received on $1.
.06 = " paid "
$.0216 = " gained "
$860 ÷ $.0216 = $39814.81 +, *Ans.*

7. $24\frac{2}{3} \times 12\frac{3}{4} \times \frac{3}{4} = 235\frac{7}{8}$ cubic feet, *Ans.*

8. 25% of cost $\times 1.33\frac{1}{3} = .33\frac{1}{3}$ of cost = receipts.
60% " × 1.20 = .72 " "
15% " × .75 = $.11\frac{1}{4}$ " "
$1.16\frac{7}{12}$ " "
$250000 $\div 1.16\frac{7}{12}$ = $214438.88 +, *Ans.*

9. $8^3 : 15^3 :: 128 : x$; $x = 843\frac{3}{4}$ lb., *Ans.*

10. He paid $560 before it was due and $1240 after. The number of days before it was due is to the number of days after it was due, as $1240 is to $560, *i. e,* inversely as the amounts paid.

$\frac{1240}{1800}$ of 45 da. = 31 da.; 31 da. before July 18 = June 17.
45 da. − 31 da. = 14 da.; 14 da. after July 18 = Aug. 1.

11. Base 45 × $\frac{1}{2}$ alt. 8 = 360 area of one end.
$1.875 × 3.60 × 2 = $13.50, *Ans.*

12. The time in which the first boy runs 3 rods equals the time in which the second boy runs 2 rods; and so of the others; hence, by conjoined proportion,

3 first = 2 second.
5 second = 6 third.
7 third = 8 fourth.
9 fourth = 10 fifth.
15 fifth = 14 sixth.
x sixth = 135 first.
Hence x = 128 rods, *Ans.*

13. 43560 sq. ft. ÷ 2 = 21780 sq. ft., area of walk.
4 corners, 12 ft. × 12 ft. × 4 = $\underline{576}$
21204, area of walk exclusive of corners.

21204 ÷ 4 = 5301, area of walk on one side.

5301 ÷ 12 = 441.75, length of walk on 1 side = side of square.

441.75 ft. = 26.77 rd.; $26.77^2 \div 160 = 4$ A. 76.6 + P., *Ans.*

14. From 21 to 50 = 29 years.
An annuity of $1 for 29 yr. at 6% = $73.639798.
$40000 ÷ $73.639798 = $543.18 +, *Ans.*

15. 114 in. × 51 × 72 ÷ 2150.4 in. = 194.66 bu.
$2.05 × 194.66 = $339.05, *Ans.*

16. $\sqrt[3]{4374 \div \overline{3 \times 2 \times 1}} = 9$; $1 \times 9 = 9 =$ height.
$2 \times 9 = 18 =$ breadth.
$3 \times 9 = 27 =$ length.

$\sqrt{27^2 + 18^2 + 9^2} = 33.67 +$ ft., *Ans.*

17. $74 × 120 = $8840
68 × 150 = 10200 $60 ÷ 1.20 = $50, average cost
54 × $\underline{130}$ = $\underline{7020}$ of whole purchase.
400   $26060; $26060 − $20000 = $6060, loss on 400 shares already bought if sold at the average price, $50. I must buy enough at a price below the average cost to balance this loss.

Bought at $40 and sold at $50, gives a gain of $10 on a share. $6060 ÷ $10 = 606 shares, *Ans.*

18. $1 \times 1.10 \times 1.50 - 1 = .65$;
$.65 \div \overline{1.10 \times 1.50} = \frac{65}{165} = \frac{13}{33}$, *Ans.*

19. $\overline{5+\frac{1}{2}}\times 2=11$; $\overline{11+\frac{1}{2}}\times 2=23$; $\overline{23+\frac{1}{2}}\times 2=47$, *Ans.*

20. A, B, C, have $\frac{47}{60}$
B, C, D, " $\frac{37}{60}$
A, C, D, " $\frac{42}{60}$
A, B, D, " $\frac{45}{60}$
A, B, C, D, " $\frac{1}{3}$ of $\frac{171}{60}=\frac{57}{60}$.

Each one's share having been counted three times, we take one-third of the sum as above.

If all have $\frac{57}{60}$, and B, C, D have $\frac{37}{60}$, A must have the difference between $\frac{57}{60}$ and $\frac{37}{60}=\frac{20}{60}=$ A.

In a similar manner, $\frac{15}{60}=$ B.
$\frac{12}{60}=$ C.
$\frac{10}{60}=$ D.

The prize must be divided into $20+15+12+10$ equal parts, of which A has 20, or $\frac{20}{57}$ of the whole.
B $\frac{15}{57}$ "
C $\frac{12}{57}$ "
D $\frac{10}{57}$ "

$6213÷57=$109; $109×20 = $2180, A's share.
" ×15 = 1635, B's "
" ×12 = 1308, C's "
" ×10 = 1090, D's " *Ans.*

27. At date of sale there is due,

Note,	$10000
2 years' interest on note,	1400
Interest on first year's interest,	49
	$11449
First year's repairs with 2 yr. int.,	228
Second " " 1 "	214
Entire outlay,	$11891

The rent, $250 per quarter, forms an arithmetical progression of which $a = \$250 + 21$ mo. int. $= \$280.625$.

$l = 250.$

$n = 8.$

From which $s = \$2122.50$, receipts from rent.

$10000 × .99 = 9900 " " sale.

$12022.50, entire receipts.

11891 " cost.

131.50, net gain, *Ans.*

22. Circumference$=3.1416\times10=31.416$.

$31.416\times10\div2=157.08$ sq. ft., *Ans.*

23. $\frac{1}{4}$ A.$=10890$ sq. ft.;

$\sqrt{10890\div.7854}=117.7+$, diameter.

$117.7+\div2=58.85$ ft., radius, *Ans.*

24. $\$6000-\$4463.40\div\overline{\$51.22\times6}=5$ payments, *Ans.*

25. $106 × 50=$5300, first cost.

$5300 × 1.225043=$6492.7279.

$6492.7279 × 1.0175 = $6606.35, cost with comp. interest for 3 yr. 3 mo. @ 7%.

First dividend $200 at comp. int. 2 yr. 9 mo.=$241
Second " 200 " 2 " 3 " = 232.99
Third " 200 " 1 " 9 " = 225.235
Fourth " 200 " 1 " 3 " = 217.745
Fifth " 200 " 9 " = 210.50
Sixth " 200 " 3 " = 203.50
$111 × 50 =5550.

Total receipts, $6880.97
" cost, 6606.35

Net gain, $274.62

26. The time in which A runs 100 rd. is equal to the time in which B runs 98 rd. And so with the others.

Hence, 100 A = 98 B.
100 B = 96 D.
94 D = 100 C.
100 C = x A; x=99.914+ rods.

100 rd. — 99.914+ =.085+ rods, C wins, *Ans.*

27. 8 cows in 3 wk. eat 2 A.+growth of 2 A. in 3 weeks.
1 " 3 " $\frac{1}{4}$ "+ " $\frac{3}{4}$ " 1 week.
1 " 1 " $\frac{1}{12}$ "+ " $\frac{1}{4}$ " 1 "

In the second case,

15 cows in 6 wk. eat 5 A.+growth of 5 A. in 6 weeks.
1 " 6 " $\frac{1}{3}$ "+ " 2 " 1 week.
1 " 1 " $\frac{1}{18}$ "+ " $\frac{1}{3}$ " 1 "

1 cow in each of the two cases eats the same.

Hence, the difference in the amount of standing grass eaten in the two cases must be made up by the difference in the amount of growth. $\frac{1}{12}$ A. — $\frac{1}{18}$ A. = $\frac{1}{36}$ A.; $\frac{1}{3}$ A. growth—$\frac{1}{4}$ A. growth=$\frac{1}{12}$ A. growth in 1 week.

If $\frac{1}{12}$ A. growth in 1 wk.=$\frac{1}{36}$ A. standing grass.
1 " " =$\frac{1}{3}$ " "

In the first case, 1 cow eats $\frac{1}{12}$ A.+$\frac{1}{4}$ of $\frac{1}{3}$ A=$\frac{1}{6}$ A. 15 cows in 2 wk. will eat $\frac{1}{6}$ A.$\times 15 \times 2$=5 A.

But 1 A. with its growth for 2 wk. equals what stands on 1$\frac{2}{3}$ A. Hence, to equal 5 A. will require as many acres with growth as 1$\frac{2}{3}$ A. is contained times in 5 A.= 3 A., *Ans.*

28.

	Amt. in	Amt. out
After 1st mixture	7	1
" 2d "	$\frac{7}{8}$ of $7+\overline{\frac{1}{8}\text{ of }1}=6\frac{1}{4}$	$1\frac{3}{4}$
" 3d "	$\frac{7}{8}$ of $6\frac{1}{4}+\overline{\frac{1}{8}\text{ of }1\frac{3}{4}}=5\frac{11}{16}$	$2\frac{5}{16}$
" 4th "	$\frac{7}{8}$ of $5\frac{11}{16}+\overline{\frac{1}{8}\text{ of }2\frac{5}{16}}=5\frac{17}{64}$	$2\frac{47}{64}$

Hence there remains in each cask of its original contents, $5\frac{17}{64}$, *Ans.*

29. $\$56\div18=\$3\frac{1}{9}$, cost of first per month.
$35\div10=3\frac{1}{2}$, " second "
$\$3\frac{1}{2}-\$3\frac{1}{9}\times240=\$93\frac{1}{3}$, gain in 20 years by wearing the \$56 suit, *Ans.*

30. x lire $=\$12500$.
$\$4.905=£1$.
$£1=25.8$ lire.
$1.005=1$; $x=65422.14$ lire, *Ans.*

31. 28 da.$\div\frac{5}{9}=50\frac{2}{5}$ days, in which the two men will perform the whole work.

In 1 da. they all perform $\frac{1}{30}$ of the work.
" " the two " $\frac{5}{252}$ "
$\frac{1}{30}-\frac{5}{252}=\frac{17}{1260}$, part of the work A or B can do.
$1\div\frac{17}{1260}=74\frac{2}{17}$, days in which A or B can do the work.
$\frac{5}{252}-\frac{17}{1260}=\frac{2}{315}$, part of the work the third can do in 1 day.
$1\div\frac{2}{315}=157\frac{1}{2}$ da., in which C can do the work, *Ans.*

32. Cash, $\frac{1}{3}$ of \$1200 $=\$400$
$\frac{1}{4}$ of $\$1200\div\$1.50=200$ bu. wheat,
$\$1.75\times200=350$
$\$1200-\overline{\$400+\$300}\div.65\times80=615.38+$
Ans, $\$1365.38+$

33. $1\frac{3}{5}$ A.$=$256 P.; $\sqrt{256}=16$ rd. each side.
$\sqrt{8^2+8^2}=11.31+$ rd., from center to corner.
$16\div2=8$ rd., from center to middle of side, *Ans.*

34. The first pipe will fill $\frac{1}{3}$ of the cistern in 1 hour. Opened at 3 o'clock, at 4, the cistern is $\frac{1}{3}$ full. The first and second together will fill $\frac{7}{12}$ in 1 hour. At 5 o'clock, when the last is opened, the cistern is $\frac{11}{12}$ full. The last empties $\frac{12}{12}$ while the first two fill $\frac{7}{12}$. With the three running, the cistern is emptied at the rate of $\frac{5}{12}$ in 1 hour. To empty the $\frac{11}{12}$ which was in when the last pipe was opened, will require as many hours as $\frac{5}{12}$ is contained times in $\frac{11}{12}=2\frac{1}{5}$ hours.

5 o'clock$+2\frac{1}{5}$ hr.$=$7 o'clock and 12 minutes, *Ans.*

35. $5280\times3\frac{1}{2}\div7=2640$, No. times fore wheel turns.
$5280\times3\frac{1}{2}\div\overline{2640-792}=10$ circum. of hind wheel.
$10\div3.1416=3.183+$ ft. diam., *Ans.*

36. $48\times36\times18\div2150.4\div2=7.23$ acres, *Ans.*

37. First complex fraction $=\dfrac{\frac{3}{5}\text{ of }\frac{3}{28}}{\frac{7}{9}\text{ of }\frac{1}{28}}=\frac{81}{35}$.

The second factor, or three fractions, equal

$$\frac{\frac{14}{195}}{\frac{16}{143}}-\frac{12\frac{29}{45}}{41\frac{1}{7}}+\frac{3\frac{9}{40}}{\frac{4}{483}}=\frac{14}{195}\times\frac{143}{16}-\overline{\frac{569}{45}\times\frac{7}{288}}+\overline{\frac{129}{40}\times\frac{483}{4}}=$$

$$\frac{1001}{1560}-\frac{3983}{12960}+\frac{62307}{160}=\frac{108108-51779+65609271}{164840}=$$

$\frac{65665600}{168480}$, this $\times\ \frac{81}{35}=902$, *Ans.*

38. This forms an arithmetrical series of which
$a=\$80+\text{int. for 17 mo.}=\$86.80$.
$l=\$80$.
$n=18$.

$$s\text{, or amt. due}=\frac{86.80+80}{2}\times18=\$1501.20\text{, } Ans.$$

39. Loss of Atlantic Co.=.50 of policy—3% of .50=.485 of policy.

Loss of Pacific Co.=full policy—(4¼%+.485) paid by Atlantic Co.=.4725 of policy.

.485—.4725=.0125 ; \$2500÷.0125=\$200000, face of policy. \$200000÷¾=\$266666⅔, full value of ship and cargo.

\$266666⅔—(\$200000 × .95¾)=\$75166⅔, *Ans.*

40.

Due.			Amt.		Days.		Product.
1875,	Apr.	2,	\$1000	×	0	=	0
“	May	5,	1200	×	33	=	39600
“	June	15,	750	×	74	=	55500
“	“	30,	1050	×	89	=	93450
			4000	×	x	=)	188550

$x = 47$ days.

Apr. 2+47 da.=May 19, to fall due May 19, it must be dated 3 mo. before, Feb. 19, 1876, *Ans.*

41. 36 × 24÷9=96 sq. yd. of carpet required.
96÷⅛=108 yd. of carpet required.
(36+36+24+24) × 12=1440 sq. ft. in walls.
1440÷12 = 120 “ “ windows.
1440÷18 = 80 “ “ doors.
$1440-\overline{120+80}$ =1240 “ to be papered.
\$4.75 × 108 = \$513 carpet.
.65 × 120 = 78 windows.
$.75\times\overline{80\div9}$ = 6.66⅔, doors.
$.30\times\overline{1240\div4\frac{1}{2}}$ = 82.66⅔, paper.
Total, \$680.33⅓, *Ans.*

42. This forms $\frac{1}{4}$ of a cone, whose altitude is 54 in., and slant height 81 in.

$\sqrt{81^2-54^2}=\sqrt{3645}$ = radius of cone; $2\sqrt{3645}$ = diam.

$(2\sqrt{3645})^2\times .7854\times 54\div 3=206120.376$ cu. in. in cone; this $\div 4$ and $2150.4=23.96$ bu. wheat.

$\$1.75\times 23.96=\$41.93$, *Ans.*

43. Capital with interest at end of year had none been withdrawn, $31800.

Assets.		Liabilities.	
$5450	Cash.	$1000	Bills Pay.
15000	Mdse.	840	Debts.
1475	Bills Rec.		
6750	Personal acct.		
$28675		$1840	
1840			

$26835	Net assets.
6432.70	Withdrawals with interest.
33267.70	Net assets had none been withdrawn.
31800	Capital with interest.
$1467.70	Net gain.

$\$33267.70\div 3=\$11089.23$, each one's capital at end of year had none been withdrawn.

$\$11089.23-\$1296.45=\$9792.78$, A's share of capital.
" $-\$2467.50=\$8621.73$, B's "
" $-\$2668.75=\$8420.48$, C's " *Ans.*

44. A gain of $2 in one case and a loss of $6 in the other shows a difference of $8 in selling prices, caused by a difference of 16¢ per lb. $\$8\div\$.16=50$, No. lb.

$\$.60\times 50-\$2=\$28$, cost, *Ans.*

45. The minute hand gains upon the hour hand 11 revolutions every 12 hours, or 1 revolution in $\frac{12}{11}$ hours.

To be at right angles between 12 and 12, the minute hand must have gained $10\frac{1}{4}$ or $10\frac{3}{4}$ revolutions since 12 o'clock.

Since it gains 1 revolution in $\frac{12}{11}$ hr., to gain $10\frac{1}{4}$ or $10\frac{3}{4}$ revolutions will require

$\frac{12}{11}$ hr. $\times 10\frac{1}{4} =$ 11 hr. 10 min. $54\frac{6}{11}$ sec., or

$\frac{12}{11}$ hr. $\times 10\frac{3}{4} =$ 11 hr. 43 min. $38\frac{2}{11}$ sec.

At either of these hours the hands form a right angle.

To be directly opposite, the minute hand must have gained $10\frac{1}{2}$ revolutions.

$\frac{12}{11}$ hr. $\times 10\frac{1}{2} =$ 11 hr. 27 min. $16\frac{4}{11}$ sec., *Ans.*

46. 1.0075 Course of exchange.

.01225 Bank discount for 63 days.

.99525 Cost of exchange.

\$7200 ÷ .99525 = \$7234.36 +, amt. received by the capitalist at the end of 63 days had there been no mistake.

\$7200 ÷ 1.0075 = \$7146.40, amt. sent.

\$7146.40 + int. for 60 days = \$7229.77.

\$7234.36 — \$7229.77 = \$4.59, loss by blunder, *Ans.*

47. $\dfrac{4.\dot{6} \times 2.\dot{1}}{6.2 \div 1.25} \div .0625 = \dfrac{4\frac{2}{3} \times 2\frac{1}{9}}{6\frac{1}{5} \div 1\frac{1}{4}} \div \frac{1}{16} = \frac{14}{3} \times \frac{19}{9} \times \frac{5}{31} \times \frac{5}{4} \times 16.$

$$\frac{.0\dot{6} \times 2.\dot{8} \times .\dot{3}\dot{6}}{4.\dot{8}5714\dot{2} \times .4 \div .\dot{1}4285\dot{7}} = \frac{1}{15} \times \frac{7}{3} \times \frac{4}{11} \times \frac{7}{34} \times \frac{5}{2} \times \frac{1}{7}.$$

$$\frac{.8 \times .\dot{8}\dot{1}}{.6} = \frac{4}{5} \times \frac{9}{11} \times \frac{5}{3}.$$

Inverting the divisor it becomes,

$\frac{14}{3} \times \frac{19}{9} \times \frac{5}{31} \times \frac{5}{4} \times \frac{16}{1} \times \frac{1}{15} \times \frac{7}{3} \times \frac{4}{11} \times \frac{7}{34} \times \frac{5}{2} \times \frac{1}{7} \times \frac{5}{4} \times \frac{11}{9} \times \frac{3}{5} = .121166+$, *Ans.*

48. $\frac{3}{8}$ A.=16335 sq. ft.; $16335 \times \frac{3}{4} \div 27 = 453\frac{3}{4}$ cu. yd.
$\$.65 \times 453\frac{3}{4} = \$294.93\frac{3}{4}$, *Ans.*

49. $1\frac{1}{2}$ mi. in $\frac{1}{3}$ hour is at the rate of $4\frac{1}{2}$ mi. per hour.
$1\frac{1}{2}$ " $\frac{1}{2}$ " " " 3 " "

$4\frac{1}{2}$ mi.$-$3 mi.$=1\frac{1}{2}$ mi., velocity of stream.

3 mi. he can row in 1 hour — $1\frac{1}{2}$ mi. the current sets him down$=1\frac{1}{2}$ mi. he ascends in 1 hr.; hence, 1 hr., *Ans.*

50. Capital 10%.

\$25000 + \$2500 — \$1500 = \$26000, Cap. at end of 1st yr.
26000 + 2600 — 1500 = 27100, " " 2d "
27100 + 2710 — 1500 = 28310, " " 3d "
28310 + 2831 — 1500 = 29641, " " 4th "
29641 + 2964.10 = 32625, " " 5th "

With the machine he had \$25000 — \$5000 = \$20000 capital. He gained each year 20% + 10% = 30%.

Capital 30%.

\$20000 + \$6000 — \$1500 = \$24500 . Cap. 1st yr.
24500 + 7350 — 1500 = 30350 " 2d "
30350 + 9105 — 1500 = 37955 " 3d "
37955 + 11386.50 — 1500 = 47841.50, " 4th "
47841.50 + 14352.45 = 62193.95, " 5th "

\$62193.95 — \$32625 = \$29568.95, gain by machine, *Ans.*